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MOBILE FEED MILLING by Cooperatives in Michigan and Wisconsin

by Arno J. Hangas

Farmer Cooperative Service
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FARMER COOPERATIVE SERVICE
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Joseph G. Knapp, Administrator

The Farmer Cooperative Service conducts research studies and service activities of assistance to farmers in connection with cooperatives engaged in marketing farm products, purchasing farm supplies, and supplying business services. The work of the Service relates to problems of management, organization, policies, merchandising, product quality, costs, efficiency, financing, and membership.

The Service publishes the results of such studies; confers and advises with officials of farmer cooperatives; and works with educational agencies, cooperatives, and others in the dissemination of information relating to cooperative principles and practices.

This study was conducted under authority of the Agricultural Marketing Act of 1946 (RMA, Title II).

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Summary

This is a case study of mobile feed milling operations of 11 cooperatives operating 15 mills in Michigan and Wisconsin in their 1957-58 operating year. The main objectives of the study were: (1) To find the policies and practices used and the problems involved in their operation, and (2) to obtain income, expense, and other operating information that may be of use to others operating, or planning to operate, similar units.

Principal findings of the study now follow.

General Description and Comparison with Stationary Service

1. Each of the 11 associations had operated a mobile mill for 3 to 6 years. Most of them had one mill each but the group did include two 2-mill and one 3-mill operations.

2. Most of the units were the first in their area. They were established because managements of the cooperatives believed that they would either increase feed volume, provide service in outlying areas, or help them get into the feed business.

3. Convenience and saving in time and physical effort were the main reasons given by managers for farmers' use of mobile milling service. They stated that such a service was best adapted for the larger dairy farmer and the more distant patron.

4. Mobile milling is a way of extending the operating territory of a retail feed store or a custom mill. On an average, locations of mobile mill patrons were farther from the mill or office than the patrons of the stationary mill in all nine associations which operated both types of mills.

5. On the whole, the grinding and mixing done by the mobile units was considered fully equivalent to that in the stationary mills of the nine associations that operated both types of mills.

Volume and Type of Service

1. The 11 associations serviced a total of 1,020 patrons with a total of 42,689 tons of grinding and mixing, or 2,846 tons a mill during their 1957-58 year. Most of the associations operated within a 20-mile radius, and 80 percent of the feed mixed was dairy feed.

2. Of the materials ground and mixed 84.6 percent were home-grown items and 15.4 percent were purchased ingredients. Fifty-eight percent of the home-grown materials was corn; 31 percent, oats; 7.5 percent, hay; and 3.5 percent was miscellaneous materials. Purchased items consisted of molasses, concentrates, and straight ingredients.

Operating Practices

1. Nine of the associations delivered ingredients separately on regular routes. In one association the ingredients were delivered with a concentrate truck which accompanied the mill, and in another case 90 percent of the ingredients were delivered by the mobile unit. Seven of

the associations made no charge for delivery. Two charged $2 a ton and two charged $3 a ton.

2. Three-fourths or more of the patrons in all the associations and all the patrons in five associations were serviced on regular routes, either weekly or at 2-week intervals. Special orders in most cases were serviced off the regular routes.

3. In some associations most of the feed was "bagged off" while in others most of it was unloaded in bulk. On the average, 55 percent was unloaded in bulk.

4. Most mobile mill operators did relatively little nutritional or sales work. In most cases this phase of the work was handled from the office.

5. Time required in mixing a batch averaged 33 minutes, and batches averaged 2,327 pounds. In all associations a wide variation existed in the time required per batch on different farms. The main reasons were: (1) Number of times the mill had to be moved, (2) number of operators used, (3) method of unloading, whether sacked or bulk, (4) type of material ground, and especially the moisture content of the grains ground, and (5) amount of help received from the patron in the one-man operated mills.

6. The associations reported a wide range in the number of times the mill had to be moved on different farms. The difference was due to the number of locations at which materials had to be picked up in processing a batch. Some managers had been able to reduce the moving required by training patrons to get the materials ready at one spot. Others could have improved their operating efficiency by training more patrons to make such arrangements.

Service Charges and Compensation Plans

1. Grinding and mixing charges ranged from $3.60 to $4.75 a batch or from $3.36 to $4.50 a ton. Some associations made an additional charge for fine grinding, sacked unloading, or if the patron did not help. Others gave discounts on the grinding and mixing fees for supplements purchased. Minimum charges for a stop ranged from $1.50 to $4.50. The credit policy in all cases was the same for both the mobile mill and other feed customers. On the average, 72 percent of the mobile mill business was done on credit.

2. The 11 associations used a variety of pay plans for compensating operators and helpers. Three paid a straight wage or salary, three paid straight commissions, and five used a combination of base pay and commissions. The method of compensation was considered less of a factor in the success of the operation than the inherent ability of the operator.

Factors Affecting Operations

1. Ability of the operator was important in the widely differing operating results among the associations. In fact managers listed the selection of a good operator as the number one problem in a mobile milling operation.

2. Managers and operators were generally satisfied with the type of equipment they had. The major mechanical problem was the power plant. Several had been replaced and most had required considerable repair and overhaul.

3. Volume of grinding and mixing varied considerably from the busy winter months to the slow summer months. On the average the volume in

the smallest week was only 58 percent of the high-week tonnage. Operators and helpers were in most cases transferred to work in the warehouse during the slack periods.

Costs and Returns

1. The grinding and mixing revenue alone failed to cover operating expenses in any of the operations. At the charges used, income from molasses or ingredient sales was needed to meet expenses -- even in the better managed operations. Grinding and mixing revenue averaged $3.73 a ton. Molasses sales brought in an average gross margin of $1.20, making a total operating margin for grinding, mixing, and molasses sales of $4.93 a ton of feed mixed. Operating expenses averaged $5.15 a ton, thus exceeding the service and molasses margin by 22 cents a ton.

2. A mill operating at the average costs and returns of this group would need an annual volume of about 3,190 tons to break even with the molasses income added to the service (grinding and mixing) revenue; or about 2,280 tons to break even if both the molasses and ingredient margin were added to the service revenue.

3. Six associations operated with two men and five with one man per mill. Volume averaged 3,208 tons in the two-man and 2,122 in the one-man mills. The one-man mills had lower labor costs but higher total costs than the two-man mills. The latter made better use of their fixed investment because of the larger volume per mill.

4. Operation of a mobile milling service on a paying basis with the fees that these associations used requires aggressive promotion of the service and a real program of feed merchandising. Since part of the margin must come from molasses and feed sales of concentrates and ingredients, customers must be sold on the benefits of a complete mixing program rather than merely the grinding and mixing service.

Management recommendations and suggestions as to advisability of cooperatives providing mobile milling service have not been included in this initial report because of the limited area and small number of mills studied. They have been deferred until studies of other mills in other areas provide a broader basis for developing such recommendations and suggestions.

Mobile Feed Milling by Cooperatives in Michigan and Wisconsin

by Arno J. Hangas

Farm Supplies Branch
Purchasing Division

On-the-farm milling of home-grown grains into balanced feeds, although a relatively new development in feed manufacturing, is increasing in importance in many grain-livestock sections. A number of cooperatives are now operating units in many scattered areas of the country.

The portable grinders that were used only to grind farmers' grain have now been replaced by complete grinding and mixing units. The first portable mills were made about 10 years ago. They have gradually been improved and now do an effective grinding, mixing and molasses blend-job. Such feed milling units are now being made by at least 12 manufacturers. With use of proper concentrates and the farmers own grains, feeds equal to those mixed in stationary custom and central mills can now be mixed right on the farm.

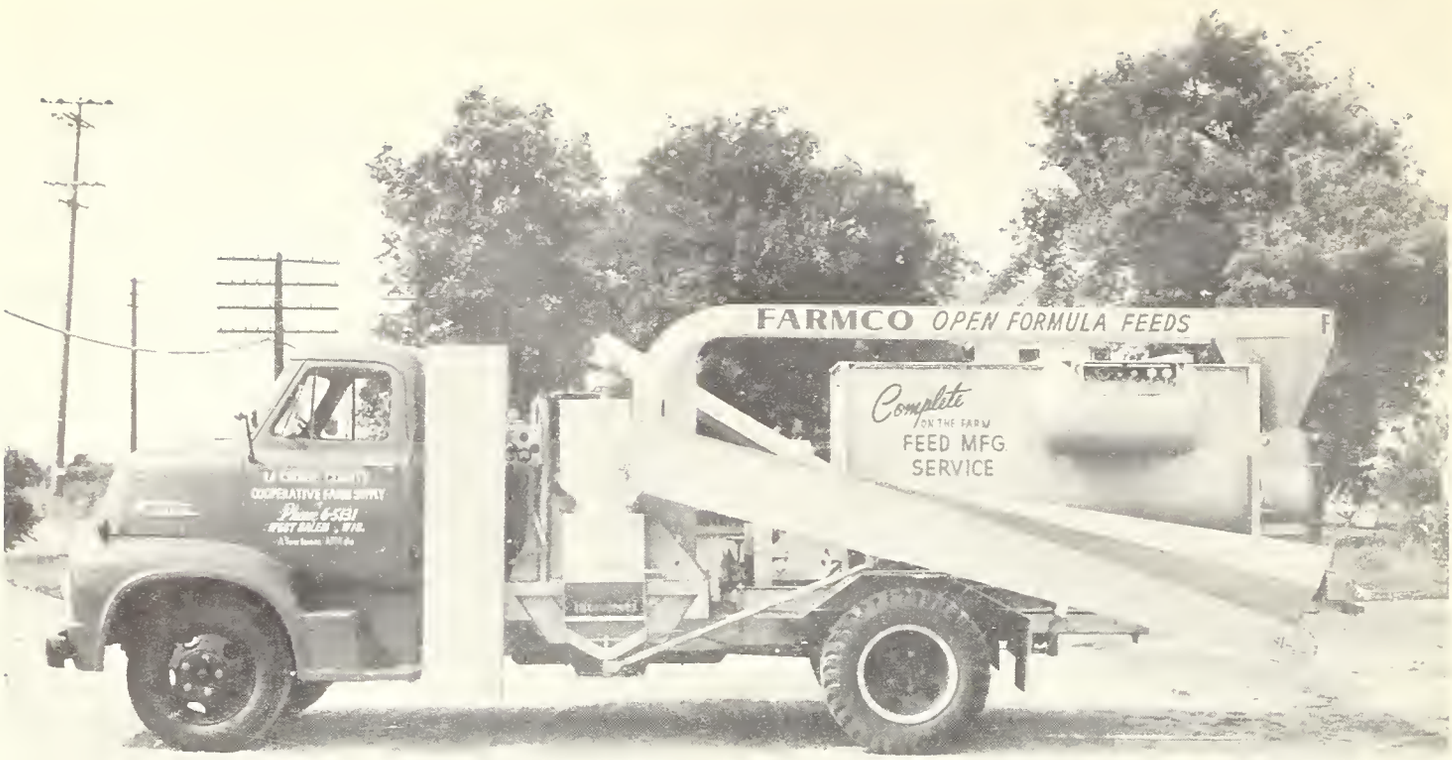
Purpose and Method of Study

The purpose of this study was to make an initial analysis of mobile feed mills for these reasons: (1) To find the policies and practices used and problems involved in their operation, (2) to find out how these policies and practices fit in with existing feed outlets and stationary custom mills, and (3) to obtain income, expense, and other operating information that may be of help to other present and potential operators of these units.

Farmer cooperatives and other operators depending on hired labor frequently have found mobile mills rather difficult to operate on a paying basis. They are an off-the-premises operation where the operator is largely on his own and cannot be easily supervised. For this reason some operators have even been forced to discontinue their mobile mill businesses. This study was made to help cooperatives and others operating mobile feed milling units improve their operations and thus provide more efficient service to farmers.

Operations of 11 cooperatives operating 15 mills in Michigan and Wisconsin were studied for their 1957-58 operating

Note: The author expresses appreciation to officials of the farmer cooperatives who provided information on their mobile milling operations, and to J. Warren Mather, Chief, Farm Supplies Branch, Farmer Cooperative Service, for substantial assistance in planning and developing this study.



A typical mobile feed mill used by feed cooperatives to grind and mix feed on patrons' farms.

year. Each of the 11 associations had operated a mill for a period of 3 to 6 years. Eight associations operated one mill each, two operated two mills each, and one association operated three mobile mills.

The better operations were selected in one area and in the other all those available were included. The group studied should therefore be slightly better than average even though it includes some less efficient operations. Usually the manager of the association was interviewed. In some cases information had to be obtained from some one other than the manager because the latter was on vacation or was new at the location. Considerable information had to be estimated as very little cost data and certain other types of information were kept separately for the mobile milling operation by any of the associations.

PART I.
Analysis of Mobile Milling Operations and Services

Part I compares mobile and stationary mills; describes types of equipment used in mobile mills, volume and types of service, practices followed, labor requirements, rates charged and credit extended, pay plans used for operators and helpers, and operating problems; and makes a brief analysis of operating receipts and expenses.

Mobile Versus Stationary Mills

This section discusses the place of the mobile mill in providing patrons with custom mixing services -- why they were added, why patrons use their services, and the relation of the mobile milling operation to the stationary custom mill.

Reason for Acquiring Mobile Mills

Most of the associations in the study added mobile milling units because management believed they would increase feed volume and improve services. The types of reasons given were:

1. Five associations thought such mills would increase feed volume;

2. Five added them to provide better service to outlying areas;

3. Three believed they would aid the association in getting into the feed business; and

4. Two cooperatives mentioned farmer demand as one of the reasons for adding the service, although it was not the main reason in either case. In some cases the interest of the local's regional wholesale cooperative in increasing feed volume was a factor in the decision.

Ten of the eleven cooperatives were the first in their area with a mobile milling service. One started after two other units were already operating in its territory, but patron demand and pressure from competing firms were not the reasons for starting the service even in this case. Instead, the mill was bought to serve the more distant patrons because the nearer ones were gradually going out of business as the city expanded into the farming area.

Although all but one of the associations were the first with mobile service in their area, 10 of the 11 had one or more competing mills by the time this study was made. One reported as many as six other mills operating within its territory.

Why Farmers Use Mobile Mill Services

Managers were asked to give reasons why they thought farmers used mobile milling services. The response was as follows:

Response	Number responding
Saves time and labor	10
Convenience	7
Farmer is sure his own grain was used	1

Thus, nearly all considered convenience and the saving in time and labor as the main reasons for changing to mobile service. Patrons do not have to load grain on their trucks, take it to the mill, and wait in line to be serviced. Instead, the mill comes to the farm and does its work in one-half to one-quarter of the time it formerly took the farmer to take his grain to town to be ground and mixed. A chore that used to take half a day of the farmer's time is now completed in an hour without the patron leaving the farm.

Out-of-pocket costs ran higher but farmers using the mobile service considered the service cheaper in the long

run because of saving in time, truck use, and physical effort.

Patrons Best Suited to Mobile Mill

Most managers and operators considered the large dairy farmer as the best candidate for mobile feed milling (table 1). They and beef operators with pen-type housing and bulk-feed facilities especially desired on-the-farm mixing because the savings in labor due to bulk handling were greater on these larger farms.

Because none of these mills carried a sheller, the service was not as well suited for the hog grower or poultryman. None of the associations had added a sheller because hog and poultry enterprises were minor sideline operations with most patrons in this area.

Mixing at stationary mills was considered best adapted for farmers with poultry and hog enterprises, smaller feeders, and those nearest the mill (table 2).

Distance from the mill enters into a farmer's decision between use of mobile or stationary feed milling service. One manager indicated that farmers more than 10 miles away from the mill will not bring their grain in for grinding.

Table 1. - *Managers' opinions on type of farmers for whom mobile feed milling service is best adapted in 11 associations operating 15 mobile mills in Michigan and Wisconsin, 1957-58*

Type of farmer	Number responding
Larger operator	10
Dairy farmer	8
More distant patron	5
Large beef feeders	2
Farmers who are conscious of value of their time	2
Larger operators who use bulk feed	1
Larger hog growers and poultrymen who have shellers but no grinders	1

Table 2. - *Managers' opinions on type of farmers for whom stationary mill service is best adapted in nine associations operating both mobile and stationary custom mills in Michigan and Wisconsin, 1957-58*

Type of farmer	Number responding
Small operator	5
Poultry and hog grower	4
Patrons nearest mill	4
Patrons who have time to take their grain to stationary custom mills	2
Patrons who have trucks	2
Larger dairymen with small hog and poultry enterprises	1
Farmers who have run out of home-grown grain	1
Farmers who do not carry a sufficient reserve of feed	1

Relative Location of Patrons

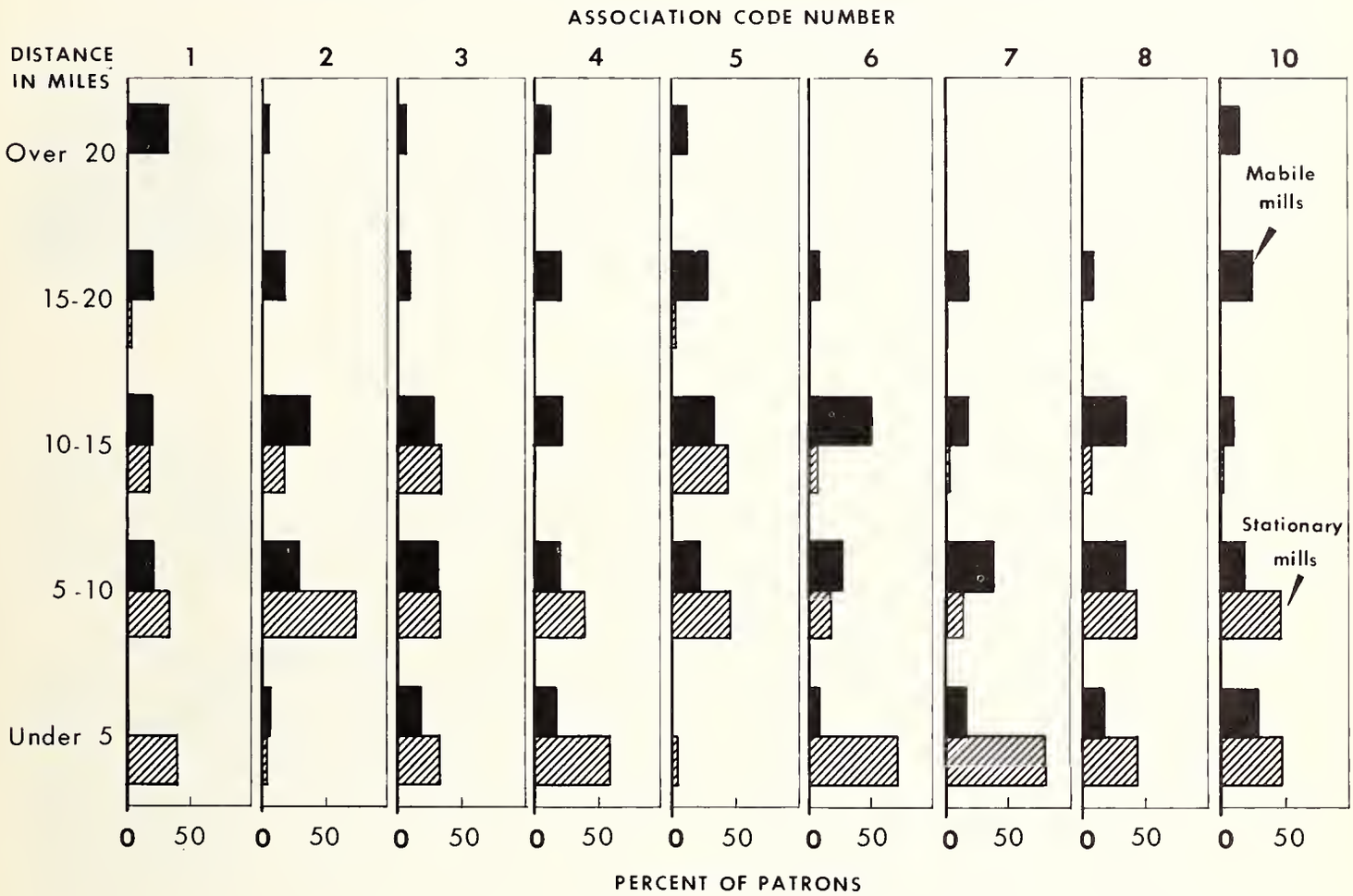
Nine of the 11 mobile operations were owned by cooperatives that also operated stationary mills. In all cases more of the mobile mill patrons were farther from the mill than the patrons of the association's stationary mill were (figure 1).

Nine of the associations estimated their stationary mill patrons were nearly all within 15 miles, and two estimated their patrons were all within 10 miles of the mill. But in 9 individual associations, 8 to 56 percent of the mobile mill patrons were over 15 miles from the mill.

All association officials were satisfied that the addition of the mobile mill had increased the number of patrons and enlarged their operating territory. Detailed information on area served and

Figure 1

PROPORTION OF STATIONARY AND MOBILE MILL PATRONS LOCATED AT DIFFERENT DISTANCES FROM STATIONARY MILLS OF NINE ASSOCIATIONS OPERATING BOTH TYPE MILLS, MICHIGAN AND WISCONSIN, 1957-58



distances traveled by these mills is discussed later in this report.

Quality of Mixing by Mobile Mills

Most managers and operators believed that the quality of grinding and mixing with the mobile mill compared favorably with the same job done in a stationary mill. In most cases grinding was considered as good as, or better than, that done by their own stationary unit. All stated that the molasses-blending job done by their mobile units was satisfactory in every respect.

None of the associations had any patrons change from mobile service back to stationary mill service. Some mobile mill customers occasionally patronized these mills when they ran out of grain; or in the slack season when they fed but little grain; but none had changed back because of dissatisfaction with the service or quality of work.

Some managers brought out the fact that although its work was mechanically as good, the mobile mill was not as economical to operate. Therefore, better labor efficiency with less expense and less upkeep would be possible in a stationary mill. One considered the mobile mill too slow for the finer grinding needed for hog feed, but he was comparing its grinding capacity with a larger 18-inch, 100 hp. hammermill in the stationary mill.

In associations in Michigan where hay grinding in stationary feed mills was prohibited by insurance regulations the mobile mill had an advantage in serving those patrons who wanted hay ground with their mixes.

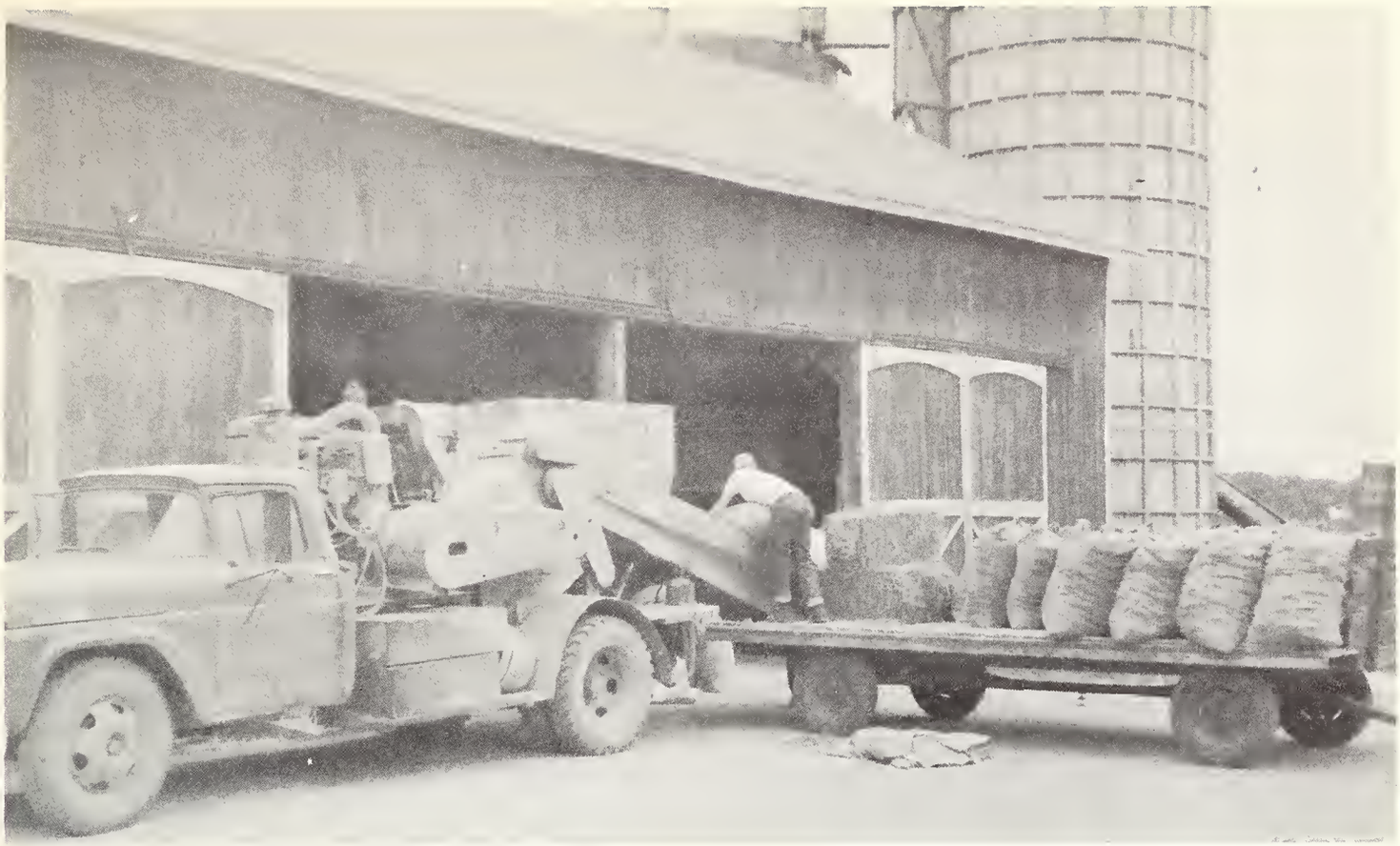
Type and Description of Equipment

All 15 mills operated by the 11 associations were factory assembled package units with a hammermill, mixer, and molasses-blending equipment, all operated by a separate diesel engine. Ten units were mounted on 2-ton chassis and one on a $1\frac{1}{2}$-ton truck. Fourteen of the 15 units had 75 cu. ft. mixers, and 16 in. hammermills driven by 100 hp. oil-burning diesel engines. One unit had a 100 cu. ft. mixer with a 12 in. hammermill driven by a 170 hp. diesel engine fueled with liquified petroleum (LP) gas. Molasses tanks had capacities ranging from about 1,700 to 3,000 pounds.

Six associations, operating 10 mills, had their mills equipped with auger conveyors for unloading in bulk. Five associations operating five mills did not have unloading augers, but three of these carried portable aluminum conveyors for bulk unloading. The other two used patron-owned conveyors, when available, for unloading in bulk.

Five mills were rented from the regional association with which the local cooperative was affiliated, and 10 mills were owned by the associations operating the units. Of the latter mills, the cost for the new unit and truck complete ranged from $14,929 to $18,263 and averaged $15,713. Cost of all 15 mills, owned and rented, ranged from $12,719 to $18,736, and averaged $16,720.

Weight of the units ranged from 15,000 to 19,000 pounds empty and 17,500 to 21,000 pounds with the usual load. The average weights were 16,104 pounds and 18,412 pounds, respectively. In



Here the patron has ingredients for grinding and mixing ready on a trailer when the mobile mill arrives.

most cases the weight crowded the maximum legal load limit in the spring, and in some cases weights had to be controlled by reducing the amount of molasses carried.

None of the units carried corn shellers. Since poultry and hog feeds were not an important item, shellers were not seriously needed on any of these mills. Neither could shellers be considered on any of the units because of the additional weight.

All the men interviewed said they were satisfied that the type of units they had were suited to their needs. One manager said he would prefer one with space for concentrate and ingredient bags but that otherwise the unit was satisfactory. In one association with two mills, each with a different size mixer, the manager would rather have had both units the same size for operating reasons and preferably of the larger size. In another association with the unit on a $1\frac{1}{2}$-ton instead of a 2-ton truck the chassis was considered too small for the job and was to be replaced with a 2-ton size when a new truck was bought.

Volume and Types of Service

This part of the report examines the type of service by area covered, volumes milled and types of feeds ground and mixed.

Patrons Serviced and Volume Mixed

The 11 associations, operating 15 mills, serviced a total of 1,020 patrons

or an average of 93 per association or 68 per mill during their 1957-58 year (table 3).

The volume of grinding and mixing totaled 42,689 tons, an average of 3,881 tons per association or 2,846 tons per mill. Volumes varied by associations from 1,170 tons for the smallest single mill operation to 10,000 tons for the one three-mill operation.

Types of Feed Mixed

Most of the feed mixed was dairy feed. It ranged from 59 to 98 percent of the total volume (table 4). Hog feed was second in importance and ranged from none in one association to 28 percent in another. Beef cattle feeds were third in importance and ranged from none in four associations to 30 percent in one association. Poultry feeds were a minor item, three associations reporting none and the rest reporting them to be from 1 to 5 percent of the total.

Kind of Grain Ground and Ingredients Mixed

Home-grown materials accounted for 84.6 percent and purchased materials for 15.4 percent of the total ingredients ground and mixed (table 5). Corn was the main grain ground but oats were an important item in every association, in one case exceeding corn in importance. As a percentage of the total feed ground and mixed corn ranged from 30 to 68 percent and oats from 10 to 42 percent of the volume. Only four associations reported grinding barley with it ranging from 2 to 15 percent of the total volume ground and mixed.

Of the home-grown grains corn represented 58 percent, oats 31 percent, hay 7.5 percent and miscellaneous materials 3.5 percent of the total. The

Table 3. - *Size of mobile milling operations of 11 cooperatives, in Michigan and Wisconsin, 1957-58*

Association code	Number of mills	Men per mill	Patrons serviced	Volume in tons
1	1	1	45	1,170
2	1	1	60	1,963
3	1	1	70	2,400
4	1	1	75	2,400
5	1	1	85	2,676
6	1	2	70	3,350
7	1	2	100	3,500
8	1	2	100	3,600
9	2	2	110	5,800
10	2	2	115	5,830
11	3	2	190	10,000
Total	15	-	1,020	42,689
Average per association	-	-	93	3,881
Average per mill	-	-	68	2,846

Table 4. - *Proportion of different feeds mixed by 11 cooperative mobile feed milling operations in Michigan and Wisconsin, 1957-58*

Association code	Type of feed mixed					
	Dairy	Hog	Poultry	Beef	Sheep	Total
	Percent					
1	94	1	[1]-	5	-	100
2	90	3	5	2	-	100
3	95	1	1	3	-	100
4	98	-	2	-	-	100
5	59	4	3	30	4	100
6	70	28	2	-	-	100
7	80	15	5	-	-	100
8	90	10	-	-	-	100
9	80	10	-	10	-	100
10	70	15	5	10	-	100
11	75	15	5	5	-	100
Average	79	12	3	6	-	100

[1]Dashes indicate none or less than 0.5 percent.

purchased ingredients consisted of 29 percent molasses, 36 percent concentrates and 35 percent straight ingredients.

All 11 associations used molasses. Its use varied from 3 to 7 percent of the total feed mixed. All associations also reported grinding hay to be mixed with the rations. The proportion ranged from less than 1 percent to 20 percent of the total volume, but in 9 of the 11 associations hay ground represented between 1

Table 5. - *Proportion of different ingredients ground and mixed in 11 cooperative mobile feed milling operations in Michigan and Wisconsin, 1957-58*

Association code number	Ingredient								
	Corn	Oats	Barley	Hay	Corn cob	Molasses	Concentrates	Straight ingredients	Total
	Percent								
1	64	10	5	10	(1)	4	5	2	100
2	60	22	-	1	-	4	6	7	100
3	50	41	-	-	-	3	3	3	100
4	43	28	15	2	-	4	5	3	100
5	68	16	5	2	-	4	4	1	100
6	58	23	2	1	-	4	8	4	100
7	38	38	-	5	-	5	5	9	100
8	35	42	-	3	-	5	6	9	100
9	67	15	-	5	-	4	5	4	100
10	30	18	-	20	10	7	5	10	100
11	50	30	-	7	-	3	6	4	100
Average	49	26	2	6	1	5	6	5	100

[1]Dashes indicate none or less than 0.5 percent.

and 10 percent of the total feed ground and mixed.

The proportion of high protein concentrates varied from an estimated 3 to 8 percent of the total feed ground and mixed. On the average, the 11 associations used almost as much straight ingredients as mill-mixed concentrates. Three associations reported using more straight ingredients than concentrates and one of them used twice as much.

Area Served and Distance Traveled

Most associations operated within a 20-mile radius and all but one within a 25-mile radius. The most compact area was served by an association with 110 patrons located within a 10-mile radius. Another association, operating considerably under capacity, had the most scattered territory with patrons as far as 54 miles away. Some associations had lopsided territories because their operations were limited to a county while the base of operations was on one side of the county.

Distance driven each year ranged from 9,600 to 22,000 miles per mill. However, all but one were within a 9,600- to 17,000-mile range (table 6). The one unit averaging 22,000 miles per year was a mill in a two-unit operation which served the distant end of a county where the association's home office was located at the edge of the territory.

Table 6. - *Average distance traveled per day and per year by 15 mobile feed mills operated by 11 cooperatives in Michigan and Wisconsin, 1957-58*

Average number of miles	Number of mills	Percent of total
Per day:		
Less than 30	1	7
30-39	2	13
40-49	3	20
50-59	7	47
60-69	2	13
Per year:		
Less than 10,000	1	7
10-12,000	1	7
12-14,000	8	53
14-16,000	2	13
16-18,000	2	13
18,000 and up	1	7

Average daily mileage ranged from 25 to 65 miles a mill. Ten of the 15 mills averaged from 40 to 57 miles of travel a day and 7 averaged from 50 to 57 miles a day.

Practices Followed

Operating practices have an important bearing on the relative success of a mobile milling operation. Some of the differences in operating practices used are discussed in this section of the report.

Ingredient Purchasing and Delivery

In nearly all cases the cooperatives purchased ingredients in carload quantities. One association, short of storage space and off the railroad, had to buy part of its concentrates and ingredients in smaller lots.

In all cases the cooperatives purchased molasses in 14- to 20-ton tank truck loads and put it in storage tanks from which it was usually pumped daily into the mobile mill molasses tank.

All except 1 of the 11 associations made separate deliveries of ingredients.

One single unit, one-man operation took care of 90 percent of the concentrate delivery with its mobile mill unit. Of the 10 delivering ingredients separately, 1 used a concentrate truck which accompanied its mobile mill. In this case the operator drove the mobile mill truck and the helper followed with the ingredient truck. The nine other associations had the mobile mill ingredients delivered on their regular feed delivery routes.

Seven associations did not charge for delivery of ingredients. Two associations charged $2 a ton and two charged $3 a ton for delivery.

Scheduling Service to Patrons

All 11 associations serviced three-fourths or more of their patrons on the basis of regularly scheduled stops. Ten serviced 90 percent or more of their patrons and four serviced all patrons on a regular schedule (table 7).

Frequency of service to regular customers was about equally split between weekly and every-other-week delivery. Only one association reported twice a week delivery of about 2 percent of its total volume. It provided twice a week service because of extremely wet corn or lack of sufficient bulk storage space on several farms with large feeding operations.

Table 7. - *Proportion of patrons serviced on regular schedules by 11 cooperative mobile milling operations in Michigan and Wisconsin, 1957-58*

Percent of patrons serviced on regular schedules	Number of associations
100	4
99	1
95	2
92	1
90	2
75	1
Total or average 94	11

All associations required advance notice from patrons serviced on an order basis. Some serviced these orders off the nearest regular route and within a week if possible. Others serviced them individually, usually requiring 1-day notice. None serviced enough patrons on an order basis to consider routing these orders separately.

Four associations, operating on a 2-week schedule, had each mill territory divided into 10 or 12 routes. The few weekly customers were serviced off the nearest route. The other seven associations had each mill territory divided into five routes for weekly service and got the every-other-week customers off the nearest weekly route.

Among the main problems mentioned in scheduling service to patrons were these:

1. Operators got behind schedule in case of breakdowns. This was especially true of the single-unit operations.

2. High moisture corn and small bin storage on some farms where feed was unloaded in bulk made frequent service trips necessary.

3. Patrons did not all run out of feed at the same time, thus making it difficult to maintain regular schedules.

One association in which patrons were expected to help with the milling operation reduced its operating week from 5 to 4 to 3 days as volume dropped during the summer. It reported objections from one patron because he

could not plan on a definite time when the mill would be at his farm. Another had no particular problems in scheduling service because the mill was not operating to capacity. It would have expected problems during breakdowns, however, had it been on a full schedule.

Method of Unloading

Some associations unloaded mostly into sacks, others mostly in bulk. The proportion of feed unloaded in bulk ranged from 5 to 95 percent (table 8).

Six of the 11 associations had their units equipped with unloading augers and unloaded 50 to 95 percent in bulk. In three of the five associations with mills without unloading augers, the operators carried portable aluminum conveyors for unloading in bulk. One association unloaded 60 percent this way. Bulk unloading in the four others ranged from 5 to 25 percent of their totals. In some cases the patron's own portable conveyor was used.

Nutritional Service

Of the 11 associations, 7 reported that their patrons discussed makeup of rations with the operator, but in only 2 did half or more of the patrons consult the operator on their mixes (table 9). In four associations, patrons were trained to get nutritional advice from the office rather than the operator.

Table 8. - *Proportion of ground and mixed materials unloaded in bulk in 11 associations operating mobile mills in Michigan and Wisconsin, 1957-58*

Percent of feed unloaded in bulk	Number of associations
95	1
90	1
70	1
60	2
50	2
25	1
10	1
5	2
Total or average 55	11

Table 9. - *Proportion of patrons who ask for nutritional advice from operator in 11 associations operating mobile mills in Michigan and Wisconsin, 1957-58*

Percent of patrons who ask for advice on formulas	Number of associations
75	1
50	1
40	1
25	1
20	2
5	1
None	4
Total	11

Some managers who had operators discuss formulas with patrons still believed they did not do enough contact work on formulas. One manager stated that his men did not do enough nutritional and selling work, even though he believed it was impossible for operators to do a complete selling job.

The concentrate program and nutritional service the locals received from their regional associations was considered adequate in every case. All those interviewed believed that the service available on type of concentrates, nutritional information, field service, and the like fully met their needs. All recognized that any weaknesses in nutritional or sales work were on the local level.

Selling Feed and Promoting the Service

Operation of a mobile milling service requires selling concentrates and

ingredients and promoting the service in addition to the actual grinding and mixing work. In most cases, the office handled sales and promotion work. Few operators were also feed salesmen. Only two managers considered that their operators did any amount of selling of either mobile service or other feeds. In five associations operators did sell some feeds other than the ingredients used with the mobile service. Two associations employed separate feed salesmen and did not expect any selling from their mobile mill operators. Operators called on prospective customers during the slow season in five associations and during the busy season in four of the same associations.

Labor Requirements

Time spent in grinding and mixing per farm or per batch has an important effect on labor costs of mobile milling operations. This section of the report discusses differences found in time spent in grinding and mixing and some of the reasons for these differences.

One-Man and Two-Man Operations

Of the 11 associations, five operated with one man and six with two men per mill. In all the one-man operations, the patron was expected to help the operator. No help was expected from the patron in any of the two-man operations but a few patrons did help.

In all the two-man operations, the operator drove the truck and took charge of the equipment. The helper assisted in shoveling grain, dumping concentrates, feeding hay, and removing the bags. In one of the six associations using two men per mill, the helper drove a separate concentrate truck which was used alongside the mobile unit for delivery of ingredients for the mill. When the men arrived at a farm, the helper usually unloaded the supplement while the operator drove the mill to the corn crib to start grinding corn.

Variations in Labor and Time Requirements

Estimates by operators and managers indicated that 9 of the 15 mills spent an average of 1 hour at each farm. Average time spent per stop ranged from 30 minutes to 75 minutes, but

These two operators are feeding baled hay and bagged oats and corn into the mobile mill.

average time per farm for four-fifths of the mills was between 45 and 60 minutes. The average amount of time spent on each farm was:

Minutes	Number of mills
30	1
45	3
60	9
67	1
75	1

The majority of the mills made about 1-1/2 batches per farm and most batches were from 2,000 to 2,400 pounds with the average of 2,327 pounds. The average number of batches ground and mixed per farm was:

Number of batches	Number of mills
1 1/4	2
1 1/3	1
1 1/2	8
2	3
2 1/2	1

The number of mills with specified sizes of batches were:

Pounds	Number of mills
1,900	1
2,000	4
2,200	1
2,300	1
2,400	6
2,600	1
3,500	1

Time required per batch on different farms varied greatly in each association depending on the number of moves required, number of operators used, moisture content of the grain ground, method of unloading, and other factors. Help of the patron was also a factor in some of the one-man operations. Average time per batch ranged from 30 to 60 minutes for the 15 mills with 11 in a 30- to 45-minute range. The number of mills spending specified amounts of time per batch were:

Minutes	Number of mills
Less than 30	2
30 to 40	11
40 and over	2

Managers or operators in each case were asked to estimate the least time and the most time required per batch. Grinding and mixing of a batch of feed on some farms took 3 or 4 times as long as the same size batch mixed on another farm where things were more conveniently arranged. In most cases, the major factors causing this additional time were controllable items such as number of points where grain or hay had to be picked up, where unloaded, and whether sacked or bulk.

The least variation in grinding and mixing time per batch was reported by an association which had its patrons trained to have the grain ready at one point so the mill made only one stop. Its manager estimated that the least time required per batch was 20 minutes and the most was 40 minutes. In another association averaging five moves per farm, the least time per batch was also 20 minutes but some farms took 1-1/2 hours per batch. Time spent in moving the mill accounted for most of this difference.

Help Received from Patrons

In the five one-man operations, from 80 to 90 percent of the patrons helped the operator and contributed on the average from 6 to 25 hours of time a week (table 10). Without this help it would have taken the operators that

Table 10. - *Help contributed by patrons in 11 cooperative mobile feed milling operations in Michigan and Wisconsin, 1957-58*

Association code number	Number of mills	Number of operators per mill	Percent of farmers who helped mill operators	Hours contributed by patrons per week
1	1	1	85	20
2	1	1	90	8
3	1	1	90	17
4	1	1	90	25
5	1	1	80	6
6	1	2	0	0
7	1	2	25	2
8	1	2	(1)	0
9	2	2	2	0
10	2	2	1	0
11	3	2	(1)	0

[1]Less than 1 percent.

much longer each week. Four of the five charged extra if the patron was not on hand to help. In three associations, this additional charge was $1 and in one it was 50 cents a batch. One manager, however, estimated that the $1 additional charge a batch where no help was given by the patron did not nearly begin to cover the extra labor and mill use required.

Patrons who helped usually shoveled grain into the feeder conveyor and took bagged feed away from the mill. In a few cases they also helped bag off.

Advance Arrangements by Patrons

In all 10 associations, patrons made some advance arrangements that helped save the mill operator's time. These arrangements usually involved getting the hay down and bagging the oats in order to have both ready -- either near the corn or else in the barn where the feed was to be unloaded. In some cases farm trailers were used to accumulate items to be ground. Corn, oats, hay, or supplement was loaded on the trailer and then fed into the mill without much lifting of bags or hay.

Besides such week-to-week arrangements as bagging the grain before the mill arrived, some patrons also made such permanent installations as bulk bins, spouting for oats, and slides at the bottom of corn cribs -- all of which saved the mill operator's time.

These advance arrangements had considerable effect on the time required for grinding and mixing on a particular farm, especially in the number of times the mill had to be moved in performing its work. In one association where patrons had been trained to have all their grain ready at one point, the milling was done on nearly all farms without moving the mill. On the other hand, 5 associations had 1 or more farms requiring as many as 10 to 19 moves per farm.

Based on estimates of operators or managers, the mills had to be moved 2.6 times at an average stop or 1.6 times for an average batch. Six associations estimated an average of three

moves per farm. The average number of moves per stop was:

Number of moves	Number of associations
0.1	1
1.5	1
2.0	2
3.0	6
5.0	1

Some associations had been more successful than others in training patrons to get things ready. More patrons made these preliminary arrangements in the associations with one-man operations than in those with two men per mill. Two associations with two-man operations reported that all patrons had the hay bales ready for grinding and another reported that a large part of them did this. Patrons did very little else in the way of advance arrangements in the two-man operations.

The associations with one-man operations reported that 40 to 95 percent of their patrons had oats and barley bagged at the right spot. In the group of five one-man operations, in which most patrons had their grain ready before the mill arrived, two managers estimated 10 hours a week and three estimated 5 hours a week saving in the operator's time and mill use as a result of these advance arrangements by patrons.

In one case 95 percent of the patrons had all the grain and hay collected at one point and ready for grinding when the mill arrived. Through a 2-year educational campaign, this association had been able to get nearly all patrons to have their grain ready at one point. Now all are required to do so. Getting the patrons to have all items to be ground and mixed at one spot has saved the association an estimated 10 hours a week in operating time and mill use.

Rates Charged and Credit Extended

Rates charged for grinding and mixing ranged from $4 to $4.75 a batch and the estimated size of batches varied from 1,900 to 2,400 pounds (table 11). Converting the rates from batches to tons, the basic rates ranged from $3.36 to $4.50 a ton. Some associations made an additional charge for fine grinding, sacked unloading (sacking feed as it was ground, mixed, and unloaded), or if the patron did not help. Some gave discounts on the grinding and mixing fee for supplements purchased.

Six associations charged the same rate regardless of fineness of grind. Five associations based the rate on a coarse or dairy grind and charged extra for fine grind. One charged an additional 40 cents and three charged 50 cents more per batch for fine grind. One association charged 75 cents more for medium grind and an additional 50 cents or $1.25 for fine grind.

Seven of the associations had the same rate for bulk or sacked unloading. Four based their fees on bulk unloading and charged 50 cents a batch more if unloaded in sacks.

As already mentioned, in the six associations operating with two men per mill, no help was expected from the patron. The patron, however, was expected to help in the five associations operating with one man per mill. Four of these charged extra if the patron

Table 11. - *Rates charged for grinding and mixing in 11 mobile feed milling operations in Michigan and Wisconsin, 1957-58*

Association code number	Base rate per batch		Method of unloading for which base rate applies (indicated by X)			Additional charge if:			Discount given for:			Average size of batch (pounds)
	Any grind	Dairy grind	Sacked	Bulk	Either	Feed is sacked	Feed is fine ground	Patron does not help	Molasses bought	Branded feeds bought		
										Per hundredweight	Maximum per batch	
1	[1] $4.50	[2] -	x	-	-	(3)	-	$0.50	[4] 1¢ pound	-	-	2,000
2	4.00	-	-	-	x	-	-	(5)	-	-	-	2,200
3	-	$4.00	-	-	x	-	$0.50	1.00	-	-	-	2,000
4	4.00	-	-	-	x	-	-	1.00	-	-	-	2,300
5	-	4.50	-	-	x	-	.50	1.00	[4] ½¢ pound	$0.50	$0.50	2,000
6	4.50	-	-	x	-	$0.50	-	-	-	.20	.50	1,900
7	-	4.00	-	x	-	.50	.50	-	-	.15	None	2,100
8	4.00	-	-	-	x	-	-	-	-	.15	None	2,000
9	-	4.75	-	x	-	.50	[6] .75	-	-	.15	.45	2,400
10	4.75	-	-	-	x	-	-	-	-	.15	None	2,400
11	-	3.60	-	-	x	-	.40	-	-	-	-	2,400

[1] Less discount of 50 cents a batch if more than one batch, provided supplement is bought.
[2] Dashes indicate that items do not apply.
[3] Less discount of 50 cents a batch if unloaded in bulk.
[4] For 100 pounds or more.
[5] Patron expected to help, but cooperative has not charged extra if he did not help.
[6] For hog grind. A 50-cent additional charge made for poultry grind.

made a habit of not being on hand to help -- one charging 50 cents and three charging $1 additional per batch.

Five associations granted discounts on feed ingredients, with four limiting the discount to branded feeds. One limited the discount to 50 cents a batch; another limited it to 45 cents a batch; and three gave volume discounts only for ingredients purchased in 5-, 10-, or 20-bag lots.

Two associations offered volume discounts on molasses, one gave 1/2-cent a pound and the other gave 1 cent a pound for 100 pounds or more. Four associations gave no discounts on ingredients or molasses.

All but one association had a minimum charge for a stop at a farm. Such charges ranged from $1.50 to $4.50, with those of seven associations in the $3 to $4 group. The number of associations with specified minimum charges for a farm stop were:

Minimum charge	Number of associations
$4.50	1
4.00	2
3.50	1
3.00	4
2.50	1
1.50	1
None	1

Five associations reported doing no grinding separately from mixing, and only a few had separate grinding and mixing rates. Three had the same rates for grinding as for grinding and mixing, and three had separate rates slightly lower than for grinding and mixing. Only two had a separate rate for mixing alone, which in both cases was $1 a ton.

All associations had a uniform credit policy for both mobile and stationary mill patrons and other feed customers. All did 50 percent or more of their mobile mill business on credit. The range among the group was from 50 to 95 percent, with the average 72 percent. The number of associations with estimated specified proportions of mobile milling operations on credit were:

Percent of volume on credit	Number of associations
95	2
90	1
85	1
80	1
75	1
70	1
50	4

Terms called for payment on either the 10th, 15th, 20th or at the end of the month following the date of purchase. Five associations charged interest at 6 percent on past-due accounts. One had this policy but did not enforce it. Five charged no interest even if the accounts became past due.

Only one of the 11 associations offered a discount for cash. It gave a 1 percent discount, and 50 percent of its sales were cash.

Pay Plans Used for Operators and Helpers

The 11 associations included in this study used a variety of pay plans for compensating the mobile mill operators and helpers. Hourly, weekly, and monthly pay plans with and without additional commissions, and straight commission plans were all used.

Two associations paid their mill operators and assistants on a straight

hourly basis with overtime after 40 hours and one used a straight weekly salary. Five used a weekly or monthly base pay plan with an additional commission based on a share of the net grinding revenue, molasses gross margin, concentrate sold, or on new customers obtained.

Three associations with one-man operations paid the operators straight commissions based on a share of the grinding revenue and molasses gross margin plus a fixed amount per ton for concentrate sold (table 12). This straight commission basis had a minimum weekly guarantee with vacation and sick-leave allowances. Two of these three also made a $4.50 weekly allowance for time spent in maintenance of the unit.

Managers and operators were generally satisfied with the pay plans in use; thus only a few had any changes to suggest in their plan. In the association with operators and helpers paid on a weekly salary and a molasses commission going only to the operators, the manager would rather have shared the commission between operators and helpers. He said the operators were doing well as far as earnings were concerned and were satisfied, but helper turnover was high. The plan had been established, however, before the manager took charge, and he had not been able to change it because operators would have been dissatisfied.

In another association where an operator was being paid on an hourly basis and doing an effective job, he would rather have been on a commission basis. The manager had not favored this plan because he believed that under it operators would not take care of their equipment as well.

In still another association with the operator on a commission basis, the

Table 12. - *Methods of compensating operators and helpers in 11 mobile feed grinding and mixing operations, Michigan and Wisconsin, 1957-58*

Type of pay plan	One-man operation	Two-man operation	Total
		Number	
1. Hourly wage, no commission	2	0	2
2. Weekly wage, no commission	0	1	1
3. Weekly wage plus new customer commission shared equally by operator and helper	0	1	1
4. Weekly wage plus molasses commission for operator only	0	2	2
5. Monthly wage plus grinding and molasses commission for operator only	0	1	1
6. Monthly wage plus grinding and molasses commission shared by operator and helper, three to one respectively	0	1	1
7. Straight commission based on grinding revenue and molasses and concentrate sales with minimum weekly guarantee	3	0	3
Total number	5	6	11

manager was not satisfied with the results he was getting, but believed that the fault was not in the pay plan but in the operator.

Of the associations using a base salary plus commission, two paid a molasses commission to the operator only -- one paying 1/3 cent and one 1/2 cent a pound. Two others, using a base salary plus commission, based the commission on a combination of molasses gross margin and grinding revenue. The three on a commission with a minimum weekly guarantee based the commission on one-third of all grinding revenue, one-half cent a pound on molasses sold, and 10 cents a bag on all branded feeds sold.

Operating Problems

This part of the report examines special problems these associations encountered in starting and operating their mobile milling services.

Problems Encountered at Start of Service

Getting patrons was the main problem encountered in starting a mobile milling service. Employing a good operator was listed as next in importance, followed by setting up routes to reduce travel and proper maintenance of the unit. Other problems mentioned are shown in table 13.

Since 10 of the 11 associations were the first in their area to start mobile milling, getting farmers to accept the service required a lot of travel, demonstrations, and promotional work. Some managers reported a lot of skepticism in mobile milling in their area at first. Many farmers thought that the mill was just another portable grinder and would not even accept a free grinding and mixing job to see what it could do. Until a sufficient number of patrons were acquired, service had to be on an order basis and required a lot of driving and time in travel.

How well the operation was started depended to a large degree on the type of operator hired to run the mobile mill. Those who could promote business as well as handle the mill helped to get the operation going better than operators who merely ran the mill and left the office force the job of finding patrons and promoting the grinding service.

Training operators in preventive maintenance of the mill was another

Table 13. - *Problems encountered in starting mobile milling service in 11 associations in Michigan and Wisconsin, 1957-58*

Problems encountered	Number of respondents
Getting farmers to accept the service	5
Getting good operators	3
Setting up routes to reduce travel	2
Maintenance problems, especially with diesel engines	2
Servicing patrons during breakdown of mills	1
Summer commitments in excess of winter capacity	1
Beginning with too-low grinding charges	1
Did not start with a program to sell feed	1
Lost some stationary mill customers because mobile mill gave service to all who wanted it	1

problem in starting the service. The importance of proper maintenance had to be learned through costly breakdowns, which disrupted the grinding and mixing schedule on the farm and resulted in customer dissatisfaction. Lack of familiarity with the diesel engine was the main reason for breakdowns.

One association said a service charge that was too low and the lack of a program to sell concentrates and ingredients in addition to grinding and mixing feed were the chief errors in starting its mobile milling operation. Grinding was at first accepted from any patron regardless of where he bought his supplements or whether he bought any molasses. The association soon learned, however, that even if the revenue from grinding, mixing, and selling molasses did pay operating costs of that operation, ingredients and concentrates would have to be sold to realize savings on the total operation.

Another cooperative, anxious to build up its mobile mill volume, found the mobile unit taking a number of patrons from its stationary mill. Later, this association emphasized finding patrons who were not already patronizing the stationary mill.

Maintenance and Mechanical Problems

A good preventive maintenance program is important in the proper operation of mobile milling units as with any involved piece of equipment. Each of the 11 associations reported using a regular schedule of maintenance with daily or weekly greasing of the mill by the operator. Truck lubrication and oil changing was done in some cases by the operator and in others by the local garage. Unit lubrication was done by the operator, either weekly on Saturday morning or according to the manufacturer's recommendations.

Good maintenance made a difference on repair costs. In the association operating three mills, one of the mobile mill operators was also the maintenance mechanic for all the mobile mills and trucks. According to the manager, the mechanic's diesel engine was still in good operating condition long after the diesels on the other two units had to be replaced.

Most of the association managers stated that the major mechanical trouble on the units occurred with the engine supplying the power to the mill. Six of these had been replaced, and several of the others had been overhauled.

Bagged cob corn is fed into the mobile mill. Baled hay is also ready on the trailer to go into the mixed feed.

Gear boxes on the units, truck rear ends and axles, and feed table transmissions were also mentioned as maintenance problems.

Seasonal Variations in Volume

As would be expected in dairy areas such as Michigan and Wisconsin, the winter months of October through March were generally the season of highest volume and the summer months of May through August the period when mobile milling volume was the lightest. All associations indicated this same general pattern although the lengths of the peak and the low-volume periods differed.

Volume and hours worked varied considerably in each association between the busy and the slow season. The lowest weekly tonnage in the 11 associations ranged from 38 to 77 percent of the volume of their peak week (table 14).

Table 14. - *Seasonal variation in time and volume of 15 mobile mills operated by 11 associations in Michigan and Wisconsin, 1957-58*

Association code number	Smallest week as a percentage of the largest week	
	Volume	Time spent
	Percent	
1	38	37
2	50	59
3	72	74
4	75	82
5	51	57
6	50	64
7	47	70
8	50	71
9	66	89
10	77	67
11	66	84
Average	59	73

Table 15. - *Proportion of time spent in various activities during busy and slack seasons by operators and assistants of 15 mobile mills operated by 11 associations in Michigan and Wisconsin, 1957-58*

Activity	Busy season	Slow season
	Percent	
In office	1.9	2.1
Loading	1.8	1.9
Traveling	21.3	22.2
Getting instructions at farm	1.4	1.5
Collecting accounts	.9	1.0
Discussing formulas	.9	1.0
Grinding and mixing	62.4	44.2
Servicing equipment	7.6	8.5
Calling on new customers	.4	.7
Working in warehouse	1.4	16.9
	100.0	100.0

Comparing labor requirements in the same way, the hours required during the slowest week averaged from 37 percent to 89 percent of the time spent during the peak volume week.

Time spent in actual grinding and mixing in the 11 associations averaged about 62 percent of the total time of the mill operators in the winter months and 44 percent in the summer months (table 15). Time in travel required a little over one-fifth of the total and did not change much from the busy to the slow season.

As volume slackened during the summer months the proportion of time spent in the warehouse increased -- from an average of only 1 percent of the total time in the winter to 17 percent in the summer. Operators and assistants helped in the warehouse during the slack season in 7 of the 11 associations. In three associations, as much as 37 percent of their time was spent in the warehouse during the off season. In

only a few cases did operators increase their effort to try to get new customers. Neither did they spend any more time in discussing formulas with existing patrons.

Time Lost Because of Inclement Weather

To determine the effect of unfavorable weather on mobile milling operations, the managers were asked to estimate the number of days lost per year because of heavy rain, other inclement weather, or unfavorable travel conditions. Six of the 11 said the operator ground and mixed every day and reported no time lost because of weather conditions. Some said the operators might get behind in their work because of slow going in heavy rain or snow but they did not stop.

In the five associations reporting time lost because of bad weather, estimates ranged from one-half day to 12 days a year per mill (table 16). Only two, however, exceeded 3 days per year. Where operators did not grind and mix because of poor weather, those on straight or base pay usually were shifted to unloading cars or housekeeping duties. Among operators on straight or part commission, one did repair and maintenance work on the mill. Another tried to select farms where he could grind under cover. In still a third association time lost was only a few hours at a time during the worst of the storm and no attempt was made to find other work for the operator.

Table 16. - *Time lost per mill because of unfavorable weather or travel conditions in 11 associations operating mobile feed mills in Michigan and Wisconsin, 1957-58*

Days lost per year	Number of associations
None	6
1/2 day	1
1 1/2 days	1
3 days	1
10 days	1
12 days	1

Table 17. - *Continuing problems in operating mobile milling service in 11 associations with 15 mobile mills in Michigan and Wisconsin, 1957-58*

Problems	Number of respondents
Finding and keeping good operators	3
Breakdowns during busy season	2
Supervision required to keep operators busy	1
Credit control difficult because manager does not see patrons	1
Need for more year-round patrons and business	1
Keeping patrons using recommended rations	1
Need for more patrons	1
None	2

Continuing Problems

Finding and keeping good operators rated first among problems still continuing with these associations in their mobile mill operations. This was especially true with the associations operating more than one mill and where the managers had some measure of relative performance by operators.

Falling behind schedule when breakdowns occurred was second among problems which still plagued operations. Other unsolved problems mentioned are indicated in table 17.

Table 18. - *Condensed operating statements of mobile milling operations of 11*

Association	Number of mills	Men per mill	Volume tons	Grinding and mixing revenue			Molasses gross margin		
				Amount	Per ton	Percent	Amount	Per ton	Percent
1	1	1	1,170	$4,972	$4.25	83	$1,000	$0.85	17
2	1	1	1,963	7,143	3.64	69	3,165	1.61	31
3	1	1	2,400	9,989	4.16	77	3,045	1.27	23
4	1	1	2,400	8,344	3.47	65	4,400	1.83	35
5	1	1	2,676	10,694	3.99	77	3,240	1.21	23
6	1	2	3,350	11,276	3.36	82	2,419	.72	18
7	1	2	3,500	13,557	3.87	70	5,850	1.67	30
8	1	2	3,600	13,326	3.70	77	4,050	1.13	23
9	2	2	5,800	23,204	4.00	76	7,475	1.29	24
10	2	2	5,830	21,013	3.60	76	6,500	1.12	24
11	3	2	10,000	35,844	3.58	78	10,247	1.02	22
Total	15	17	42,689	159,362	-	-	51,391	-	-
Average	-	-	3,881	14,487	3.73	76	4,672	1.20	24

[1]Mill number 1 was a part-time operation. If omitted, the margin from grinding, mixing and molasses sales would have averaged $4.92 a ton and total operating costs would have averaged $5.08 a ton thus reducing the loss from 22 cents to 16 cents a ton.

Table 19. - *Operating costs per ton of feed ground and mixed in 11 associations*

Association	Volume tons	Labor		Rent		Depreciation		Interest		Insurance	
		Per ton	Percent	Per ton	Percent	Per ton	Percent	Per ton	Percent	Per ton	Percent
1	1,170	$2.45	32.1	[1]	-	$2.78	36.5	$0.38	5.0	$0.07	.9
2	1,963	2.06	34.2	-	-	1.78	29.5	.22	3.6	.05	.8
3	2,400	1.89	39.6	-	-	1.28	26.7	.19	3.9	.03	.7
4	2,400	2.09	39.9	-	-	1.45	27.8	.19	3.6	.05	.9
5	2,676	2.08	38.2	-	-	1.05	19.3	.16	2.9	.04	.7
6	3,350	1.86	38.9	$1.36	28.5	-	-	-	-	.09	1.8
7	3,500	2.64	53.3	1.20	24.3	-	-	-	-	.07	1.5
8	3,600	2.18	50.2	1.17	26.8	-	-	-	-	.07	1.6
9	5,800	2.76	52.3	.76	14.4	.52	9.8	.06	1.2	.05	.9
10	5,830	2.84	52.1	.52	9.4	.37	6.6	.05	1.0	.07	1.2
11	10,000	2.81	57.1	-	-	.93	18.9	.13	2.6	.10	2.0
Average	3,881	2.48	48.2	[2].48	[2]9.3	[3].71	[3]13.9	.10	1.9	.07	1.3
Average omitting association 1[4]	3,774	2.49	48.8	.49	9.7	.66	12.9	.09	1.8	.07	1.3

[1]Dashes indicate none or not applicable.
[2]Average rent based only on those paying rent was $1.26 a ton or 25.4 percent.
[3]Average depreciation based only on those with depreciation was $1.15 a ton or 21.8 percent.
[4]On basis that it was a part-time operation.

cooperatives in Michigan and Wisconsin, 1957-58

Association	Grinding, mixing and molasses margin		Operating expenses		Net margin	
	Amount	Per ton	Amount	Per ton	Amount	Per ton
1	$5,972	$5.10	$8,931	$7.63	-$2,959	-$2.53
2	10,308	5.25	11,844	6.03	-1,536	-.78
3	13,034	5.43	11,441	4.77	1,593	.66
4	12,744	5.30	12,570	5.23	174	.07
5	13,934	5.20	14,568	5.44	-634	-.24
6	13,695	4.08	16,052	4.79	-2,357	-.71
7	19,407	5.54	17,326	4.95	2,081	.59
8	17,376	4.83	15,649	4.35	1,727	.48
9	30,679	5.29	30,621	5.28	58	.01
10	27,513	4.72	31,998	5.48	-4,485	-.76
11	46,091	4.61	49,237	4.92	-3,146	-.31
Total	210,753	-	220,237	-	-9,484	-
Average	19,159	[1]4.93	20,022	[1]5.15	-	[1]-0.22

operating 15 mills in Michigan and Wisconsin, 1957-58

Association	Personal property tax		Repair, upkeep, gas, oil and diesel fuel		License fees		Miscellaneous		Total operating costs	
	Per ton	Percent	Per ton	Percent	Per ton	Percent	Per ton	Percent	Per ton	Percent
1	$0.18	2.4	$1.69	22.1	$0.05	0.6	$0.03	0.4	$7.63	100.0
2	.10	1.6	1.67	27.7	.03	.5	.12	2.1	6.03	100.0
3	.05	1.2	1.22	25.6	.02	.5	.09	1.8	4.77	100.0
4	.04	.8	1.21	23.1	.02	.5	.18	3.4	5.23	100.0
5	.08	1.5	1.87	34.3	.02	.4	.14	2.7	5.44	100.0
6	.03	.5	1.24	25.7	.06	1.3	.15	3.3	4.79	100.0
7	.05	1.0	.91	18.3	.06	1.2	.02	.4	4.95	100.0
8	-	-	.78	17.9	.05	1.2	.10	2.3	4.35	100.0
9	-	-	1.02	19.4	.07	1.3	.04	.7	5.28	100.0
10	.02	.5	1.44	26.1	.06	1.1	.11	2.0	5.48	100.0
11	.03	.7	.80	16.3	.06	1.2	.06	1.2	4.92	100.0
Average	.04	.7	1.14	22.0	.05	1.0	.08	1.7	5.15	100.0
Average omitting association 1[4]	.03	.7	1.12	22.1	.05	1.0	.08	1.7	5.08	100.0

Analysis of Operating Receipts and Expenses

Part II of this report presents individually the mobile milling operating statements of each of the 11 cooperatives included in this study. For purposes of comparison the principal items from these statements are assembled in tables 18 and 19. The former shows the income items less total operating expenses to arrive at the net margin from grinding and molasses sales. The latter shows the detailed items making up the operating expenses.

Grinding and mixing service revenue alone did not cover expenses in any of the operations. Income from molasses sales was needed to cover all operating expenses even in the better managed operations. With the molasses gross margin added to the grinding and mixing revenue, the combined net operating margin still failed to fully cover all expenses in over half the associations.

Grinding and mixing revenue averaged $3.73 a ton. The molasses sales brought in an average gross margin of $1.20 a ton, making a total gross margin from grinding and mixing and molasses sales of $4.93 a ton of feed mixed. Operating expenses, on the other hand, averaged $5.15 a ton, thus exceeding the service and molasses margin by 22 cents a ton.

Labor was by far the most important cost item in the operation of a mobile mill, averaging 48 percent of the total cost in this group of mills. Rent, depreciation, and interest together averaged 25 percent. Repairs, upkeep, gas, oil, and diesel fuel represented another 22 percent. Licenses, insurance, and other miscellaneous costs made up the remaining 5 percent of the total costs.

Three of the associations rented all their units, six owned all theirs, and two rented some and owned other units. Therefore, some had a rental charge and others a charge for depreciation and interest in their operating expenses. Depreciation was based largely on majority practice in the area which was a 5- to 6-year depreciation schedule. The mills may last longer but they will be partly obsolescent before then.

Upkeep and fuel are grouped together in this summary because a few associations did not have this information separately. These items, however, appear separately in the individual operating statements for the associations having such data.

All the units were adequately protected by insurance, including collision,

Table 20. - *Summary of costs per ton by one-man and two-man mobile feed mill operations of 11 cooperative associations in Michigan and Wisconsin, 1957-58*

Type of operation	Tons ground and mixed		Average cost per ton			
	Total	Average per mill	Fixed	Operating		Total
				Labor	Other	
Ten two-man mills	32,080	3,208	$1.31	$2.61	$1.09	$5.01
Five one-man mills	10,609	2,122	1.88	2.07	1.64	5.59
All mills	42,689	2,846	1.45	2.48	1.22	5.15

comprehensive fire and theft, and automobile liability coverage. Operating hazards were protected by public liability policies covering all operations of the associations including the mobile mills. Premiums on the public liability policies were on a payroll basis.

Five of these units operated with 1 man and 10 with 2 men per mill. In table 20 costs are summarized on the basis of one-man and two-man operations. The one-man operated mills had 54 cents a ton lower labor costs but 57 cents a ton higher fixed costs and 55 cents a ton higher other operating costs. Thus total costs were 57 cents a ton higher for the one-man than the two-man mills. The latter made better use of their fixed investment because of the larger volume per mill.

When grouped according to volume per mill, total operating costs per ton averaged $4.80 for the six mills with over 3,000 tons of grinding and mixing a year compared with $5.30 a ton for the seven mills with 2,000 to 3,000 tons per year and $6.63 for the two with less than 2,000 tons a year (table 21). Costs other than labor declined from $3.42 a ton for the two mills with less than 2,000 tons of volume to $2.29 a ton for those with over 3,000 tons a year.

Labor costs were influenced less by volume than by other factors such as number of operators per mill. Employment of one operator on a commission basis and transfer of the other operator to other work when there was no grinding and mixing to be done also partly accounted for the slightly lower labor costs for the two small-volume mills.

Table 21. - *Costs per ton by volume per mill in 11 cooperative mobile feed milling operations in Michigan and Wisconsin, 1957-58*

Volume per mill (Tons)	Number of		Average volume per mill	Average cost per ton		
	Associations	Mills		Labor	Other[1]	Total
Less than 2,000	2	2	1,566	$2.22	$3.42	$6.63
2,000 to 3,000	5	7	2,729	2.49	2.80	5.30
Over 3,000	4	6	3,408	2.51	2.29	4.80
Average	-	-	2,846	2.48	2.69	5.15

[1]Includes fixed costs and operating costs other than labor.

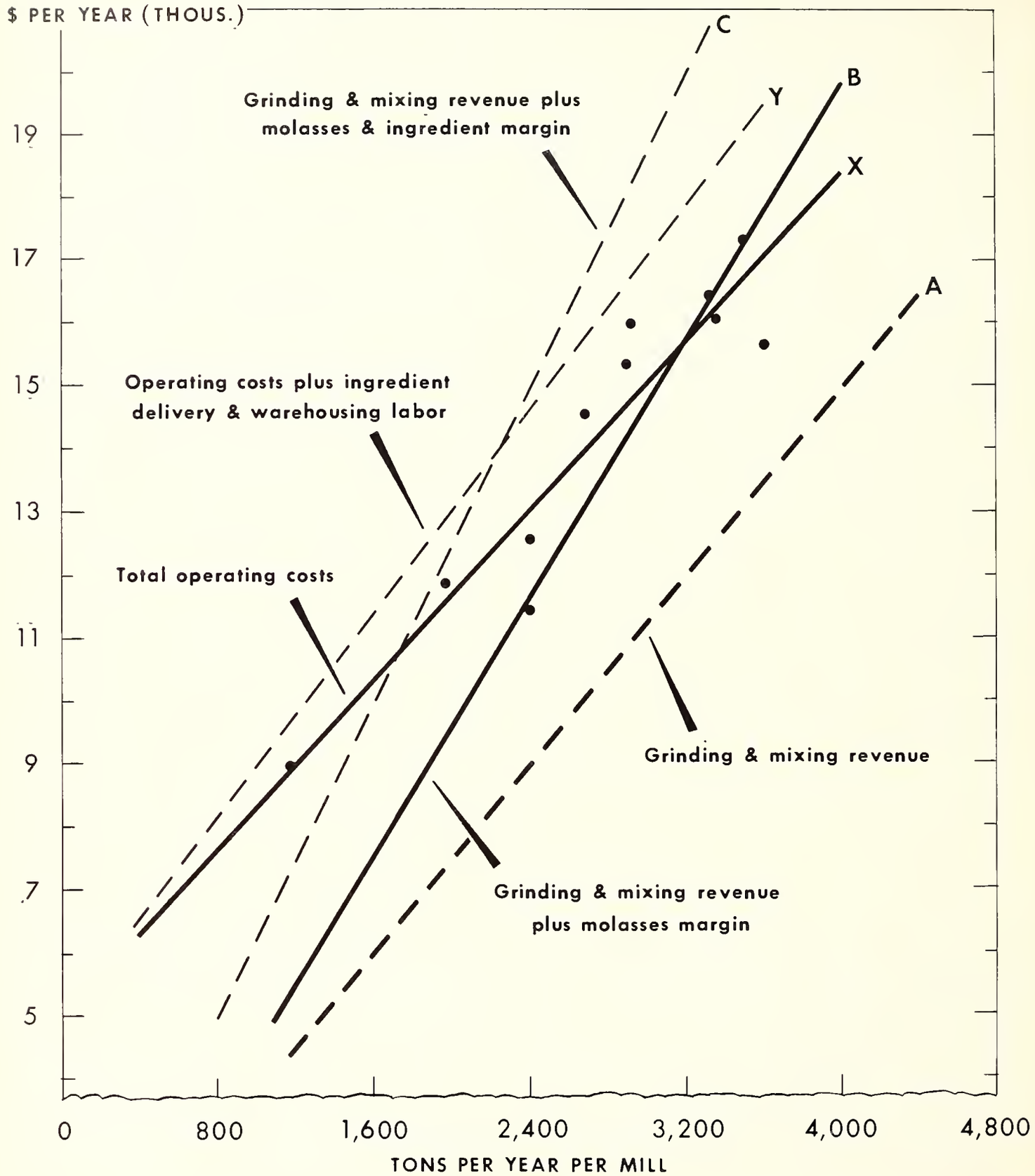
Break-Even Points

A volume of 3,190 tons of grinding and mixing a year will be needed to break even at the average grinding and mixing service charge and molasses gross margin obtained by these mills. Figure 2 -- based on income and cost information from table 18 -- shows this. If margins for ingredients other than molasses are also included, approximately 2,280 tons of grinding and mixing would be needed to break even after paying for the ingredient delivery and warehousing.

Line X shows costs at various volumes. It is a trend line fitted to the cost data of the 11 associations operating at different volumes.

Figure 2

COMPARISON OF GROSS MARGINS AND OPERATING COSTS, AVERAGE OF 11 MOBILE MILLING OPERATIONS IN MICHIGAN AND WISCONSIN, 1957-58



Line A shows grinding and mixing service revenue at various volumes applying average service charges used by these associations. It is evident that grinding and mixing revenue alone (line A) will not equal operating costs (line X) at any practical volume.

Line B adds the average molasses gross margin to the grinding and mixing service revenue shown by line A. It meets cost line X at about 3,190 tons.

Line C adds the gross margin from concentrate and ingredient sales to the grinding and mixing service revenue and molasses margin. In addition to the molasses, all associations sold concentrates and other ingredients required in performing mobile milling services. The gross margin from these averaged $1.28 a ton of grinding and mixing.

Line Y adds the ingredient delivery costs and warehousing labor to the other operating costs shown in line X. These additional costs averaged 67 cents a ton of grinding and mixing.

Considering the concentrate and ingredient income and the added delivery costs and warehousing labor, the average mill would break even at about 2,280 tons per year (line C compared with line Y). That is, a mill operating at this volume under average conditions would pay for all operating costs of the mill, the delivery of the ingredients to the farm, and the labor costs of warehousing the ingredients.

PART II.
Case Studies of Individual Mobile Milling Operations

This section presents the individual operating statements for each of the 11 mobile feed milling operations with the detailed income and expense items available in each case. All the mills operated in conjunction with other farm supply services and many of the expense and other items had to be estimated because only a few had kept such data separately on their mobile milling operations.

The statements cover operations for the 1957-58 operating year. The individual operating statements have not been condensed because it was assumed that operators of mobile units may be interested in detailed income and expense items for comparison with their own operations. Some of the operating statements include items of overhead costs while others do not because this information was not available. For this reason, the reader should not compare the final margins without close attention to the deductions from, or additions to, the net margin from grinding, mixing, and sale of molasses.

A brief description of each milling operation gives background information to help interpret the operating results. By considering volume, number of operators, and other factors, some idea can be obtained of the conditions under which these mills were operated.

The mills may be grouped roughly into three classes:

1. One man, single-mill operations. Mills 1, 2, 3, 4, and 5 were all single-unit operations with one man on each mill.

2. Two-man, single-mill operations. Mills 6, 7, and 8 were all single unit operations with two men on each mill.

3. Two-man, multiple-mill operations. Mills 9, 10, and 11 were 2-unit and 3-unit operations with two men on each mill.

One-Man, Single-Mill Operations

First to be considered are the five mills that fell into this category.

Mobile Milling Operation Number 1

Mill number 1 was a one-man single unit, operating under a part-time load. It started mobile service in 1952 and was the first such service in its area.

This mill served 45 patrons with a total volume of 1,170 tons in 1957-58. Volume was down 380 tons from the year before because farmers had less grain to grind and the association reported serving more patrons from the stationary mill than the year before.

The original mobile mill with a 75 cu. ft. mixer was still in use, but the 100 hp. engine had been replaced in 1955. The truck was also replaced late in 1957. The unit carried no unloading auger and 75 percent of the feed was sacked. Ten patrons who had their own portable conveyors unloaded their feed in bulk from the mill.

Of the total volume, 94 percent was dairy feed, 6 percent, beef cattle feed, and about 1 percent hog feed. Sixty-three percent of the volume was cob corn, 10 percent oats, 5 percent barley, 10 percent hay, 4 percent molasses, 5 percent concentrate, and 3 percent was protein meals, minerals, and low-protein ingredients.

Ninety-two percent of the volume was milled on a regular schedule -- about half of it weekly and the other half every other week. The 8 percent of the volume serviced on an order basis represented mostly patrons near the mill who were serviced individually, usually within a day of the order. During the winter months the area was divided into five weekly routes, but this was reduced to four and then to three weekly routes as the volume declined in the summer months.

The grinding and mixing rate was $4.50 a batch which averaged 1 ton. This was for any grind unloaded in sacks. A discount of 50 cents a batch was given if unloaded in bulk but this applied only to the first batch. Another discount of 50 cents a batch was given if more than one batch was mixed.

Patrons were expected to help the mill operator and 85 percent of them helped by shoveling grain or carrying the bags away from the mill. Where the patron was regularly absent, 50 cents additional was charged per batch. In cases where less than a full batch was mixed, a minimum fee of $3 was charged for a farm stop.

The operator received an hourly wage subject to overtime after 40 hours. During the summer when the mill did not furnish a full week's work, the operator worked in other departments of the association.

This milling operation proved highly unprofitable because of the very low volume in relation to the fixed costs of

the mobile mill. Grinding and mixing revenue and molasses margins together failed by $2,959 of paying operating expenses. Estimated gross margin on ingredients was only $1,898 which no more than covered the direct warehousing and delivery costs.

Following is the operating statement of mobile mill number 1 for its operating year 1957-58:

Mill Number 1

	Amount	Per ton
Income		
Grinding and mixing revenue	$4,972	$4.25
Molasses margin on sales of $3,200	1,000	.85
Total milling revenue and molasses margin	5,972	5.10
Expenses		
Wages	2,700	2.30
Payroll costs	173	.15
Depreciation	3,262	2.78
Repair and upkeep	960	.82
Gas, oil, and diesel fuel	1,012	.87
Insurance	77	.07
License	56	.05
Personal property taxes	216	.18
Travel	12	.01
Advertising	13	.01
Telephone	10	.01
Interest on average investment @ 5 percent	440	.38
Total operating expenses	8,931	7.63
Net margin from grinding, mixing, and molasses sales	-2,959	-2.53
Gross margin on ingredient sales of $11,054	1,898	1.62
Margins available to pay for delivery and warehousing of ingredients and for other overhead items	-1,061	-.91

Mobile Milling Operation Number 2

Mill number 2 was a single-unit, one-man mill owned by an association with a stationary mill. It started early in 1952, the first and still the only mobile unit within a 50-mile area. There was no shortage, however, of stationary custom mills in the territory. Lack of a molasses blender at the stationary mill was one of the main reasons reported for adding the portable unit. A molasses mixer, however, has been added since then at the stationary mill.

The original mobile mill with a 75 cubic foot mixer was still in use, but the 100 hp. engine was replaced after $3\frac{1}{2}$ years of use and the truck after 4 1/3 years. The unit does not have an unloading auger, but the operator carries a portable aluminum conveyor and unloads about 60 percent of the volume in bulk.

Here a mobile feed mill is ready to leave cooperative headquarters accompanied by a truck carrying concentrates and other ingredients. The operator's helper drives the ingredients truck.

The association serviced 60 customers during the 1957-58 year with 1,963 tons of feed. Of the total volume, 90 percent was estimated to be dairy feed, 5 percent poultry feed, and 2.5 percent each hog and beef cattle feeds. Home grown feeds ground were corn, oats, and hay. They represented 60, 21.5, and 1 percent, respectively, of the total volume. Balance of the ingredients consisted of 6.5 percent high-protein concentrates, 4.5 percent molasses, and 6.5 percent protein meals and low-protein ingredients.

All but 5 percent of the volume was serviced on regularly scheduled stops, 75 percent of them weekly and 25 percent every other week. The 5 percent of volume delivered on order was serviced within the week off the nearest route. No special trips were made to serve any of these orders. Ingredients were delivered separately by regular feed delivery truck. Only emergency ingredient orders were delivered on the mill.

Grinding and mixing rates charged were $4 a batch, averaging about 2,200 pounds. The rate did not vary for fineness of grind or method of unloading. A discount of 5 cents was given if supplement was bought in 500-pound lots and 10 cents if in ton lots. The patron was expected to help the operator and 90 percent of them did help, but no extra charge had been made if the patron did not cooperate. The minimum rate for a farm stop was $3 when less than a batch was ground and mixed.

The operator was paid on a commission basis -- getting one-third of the grinding and mixing revenue, one-half cent a pound on all molasses, and $2 a

ton for all branded concentrates sold on the machine. In addition, he was guaranteed $60 a week and got 2 weeks vacation at full pay, 10 days a year sick leave at $10 a day, and $4.50 a week for equipment maintenance. Commissions had not fallen below the $60 minimum for the past 3 years.

Grinding and mixing revenue and molasses gross margin failed by $1,536 of paying for total operating expenses. A margin of $1,419 above delivery costs was left from ingredient sales. Combining these two figures left a loss of $117 from grinding, mixing, molasses, and ingredient sales, after paying for direct operating expenses and costs of ingredient delivery, but not including ingredient warehousing costs or other overhead costs.

Following is the operating statement of mobile mill number 2 for its operating year 1957-58:

Mill Number 2

	Amount	Per ton
Income		
Grinding and mixing revenue	$7,143	$3.64
Molasses margin on sales of $6,664	3,165	1.61
Total milling revenue and molasses margin	10,308	5.25
Expenses		
Wages	3,120	1.60
Commissions	677	.34
Payroll costs	243	.12
Depreciation	3,502	1.78
Repair and upkeep	1,790	.91
Gas, oil, and diesel fuel	1,494	.76
Insurance	98	.05
License	60	.03
Personal property taxes	192	.10
Travel	124	.06
Telephone	72	.04
Office supplies and postage	48	.02
Interest on average investment @ 5 percent	424	.22
Total operating expenses	11,844	6.03
Net margin from grinding, mixing, and molasses sales	-1,536	-.78
Gross margin on ingredient sales of $22,471	2,962	1.51
Less: Labor and truck use delivering ingredients	1,543	.79
Margin on feed ingredients after delivery costs	1,419	.72
Net margin from grinding, mixing, molasses and ingredient sales after paying for operating expenses and delivery of ingredients	-117	-.06

Mobile Milling Operation Number 3

Mill number 3 was a one-man, single-unit operation started in 1953 to supplement the association's stationary custom mill. One other mill has been operating in the area for the last 2 years.

The mill has a 75 cu. ft. mixer and 100 hp. diesel engine. The mill was not equipped with an unloading auger; therefore all feed was sacked except about 5 percent of the total for three customers who have their own conveyors for moving feed to bins. The original engine on the mill gave a lot of mechanical trouble and was replaced after 2 years with a new one of the same size but another make.

About 70 customers were serviced during 1957-58 with a total of 2,400 tons. The operator delivered about 90 percent of the ingredients on the mill. Farmers picked up about half of the remainder, and the other half was delivered on the regular feed delivery routes.

Ninety-five percent of the feed ground and mixed was for dairy cattle, 3 percent for steers, and 1 percent each for hogs and poultry. Farm grains ground were corn and oats representing 50 percent and 41 percent respectively of the total tonnage. The remainder of the ingredients consisted of 3 percent molasses, 3 percent high protein concentrate, 2 percent protein meals, and 1 percent minerals, hay, and low-protein ingredients. Very little hay was incorporated into feeds in this area as only about 5 tons were ground during the year.

All patrons were serviced on a regular schedule, 90 percent of them every other week and 10 percent weekly. The weekly customers were serviced off the nearest routes that regularly served customers on a biweekly basis.

The grinding and mixing charge was $4 a batch, which usually was about 2,000 pounds. This was for a dairy grind, and an additional charge of 50 cents a batch was made for fine grind. Since this was a one-man milling operation, the patrons were expected to help. About 90 percent of them did help the operator by shoveling grain onto the feeder and taking feed bags away from the mill. Some also helped to bag feed. An additional $1 a batch was charged patrons who made it a habit to be away when the mill was scheduled to arrive at their farm. The minimum rate for a farm stop was $3 for less than a full batch. The rate at the association's stationary mill was 12 cents a bag for feed brought in for milling.

The manager estimated that the patrons contributed about 16 hours a week, thus reducing the operator's time that much in an average week. In addition, about 60 percent of the 70 patrons bagged their oats and had it ready at the granary. This saved the operator another 5 hours a week. The managers believed that another 20 percent could bag their oats which would save another $1\frac{1}{2}$ hours of the operator's time.

The average number of moves the mill made on farms was $1\frac{1}{2}$. About 50 percent of the farms required one move.

The operator was on a commission basis and received one-third of all grinding revenue, one-half cent a pound on molasses, and $2 a ton on branded feeds used in the mix. In addition he received 2 weeks vacation at $60 a week and up to 12 days sick leave at $10 a day. He was guaranteed a minimum of $60 a week but his commissions had never been below the guarantee.

Receipts from grinding and mixing revenue and from molasses sales left a net margin of $1,593 after all operating expenses. Expenses included cost of delivering 90 percent of all the ingredients hauled by the operator on the mill truck. Ingredient sales of $13,194 grossed $1,839, which was available to apply against warehousing expenses and delivery costs of the 5 percent of ingredients delivered on the regular feed routes.

Following is the operating statement of mobile mill number 3 for its operating year 1957-58:

Mill Number 3

	Amount	Per ton
Income		
Grinding and mixing revenue	$9,989	$4.16
Molasses margin on sales of $6,960	3,045	1.27
Total milling revenue and molasses margin	13,034	5.43
Expenses		
Wages	3,120	1.30
Commissions	1,191	.50
Payroll costs	218	.09
Depreciation	3,061	1.28
Repair and upkeep	924	.38
Gas, oil, and diesel fuel	2,010	.84
Insurance	75	.03
License	57	.02
Personal property taxes	131	.05
Travel	20	.01
Advertising	17	.01
Office supplies and postage	70	.03
Bad debts	100	.04
Interest	447	.19
Total operating expenses	11,441	4.77
Net margin from grinding, mixing, and molasses	1,593	.66
Gross margin on ingredient sales of $13,194 (90 percent delivered on mobile unit)	1,834	.76
Margins available to pay for delivery and warehousing of ingredients and for other overhead items	3,427	1.42

Mobile Milling Operation Number 4

Mill number 4 was a one-man, single-unit operation started in the fall of 1953. The association had a stationary custom mill and the mobile unit was added to try to gain additional feed volume. It was the first mobile unit in the area. Two competing units were operating in the association's trade area at the time of the study.

The original mill, equipped with a 75 cu. ft. mixer, was still in use; but the truck was replaced in 1955 and the 100

hp. engine was replaced in 1957 by the same size engine of another make. The unit had no unloading auger, but the operator carried a portable aluminum conveyor for unloading the 10 percent of the volume unloaded in bulk.

The unit ground and mixed feed for about 75 patrons during 1957-58 and volume totaled 2,400 tons. Ninety-eight percent of the volume was dairy and steer feed and about 2 percent was poultry feed. Ingredients that made up the volume were cob corn, 1,030 tons; oats, 665 tons; barley, 362 tons; molasses, 110 tons; concentrate, 110 tons; hay, 40 tons; minerals, 40 tons; high protein meals, 36 tons; and wheat byproducts, 7 tons.

All the patrons were serviced on a regular schedule, 90 percent of them weekly and 10 percent every other week. Except for special orders, feed ingredients were all delivered separately on the regular feed delivery routes. Grinding and mixing charge was $4 a batch estimated to average 2,300 pounds. This was for either bulk or sacked feed and no extra charge was made for fine grinding on the theory that the patrons used more supplements when the feed was ground fine. The manager believed they used up to 1,000 pounds of purchased feed compared with 200 pounds a batch when the feed was coarse ground. The patron was expected to help the operator and an extra $1 a batch was charged if the patron regularly did not help. A minimum charge of $3.50 a batch was made for processing less than a full batch.

The one operator was paid a straight hourly salary with time-and-a-half over 40 hours. An hourly pay plan was in use because management believed that operators on a straight commission would not take proper care of their equipment. The manager was satisfied with the pay plan, but the operator would rather have been on a commission basis.

The mill's operation for 1957-58 netted $174 from the grinding and mixing revenue and the molasses margin after paying all operating expenses. Ingredient sales, other than molasses, totaled $24,947 and grossed $3,701, but no cost information was available on delivery or warehousing expenses. A $2 charge was made for ingredient delivery but this was recognized as inadequate to cover actual costs.

The operating statement of mobile mill number 4 for its operating year 1957-58 is at the top of page 37.

Mobile Milling Operation Number 5

Mill number 5 was a single-unit, one-man mill which had been in service since the fall of 1952. The original truck and mill with a 75 cu. ft. mixer were still in use, but the 100 hp. engine had been replaced early in 1957 when it was ready for its third overhaul.

The association's mill was the third unit in the area. It was added because nearby dairymen were gradually selling out as the city expanded into the farm area and it appeared evident that most of the remaining patrons would eventually be too far from the association's stationary mill. The nearest patrons were from 4 to 6 miles from the warehouse, and in one direction the nearest patron was 12 miles away. There were six competitors operating six mills within the association's trade territory at the time of this study.

The mill serviced 85 patrons during the year with a total of 2,676 tons of feed, 95 percent of it unloaded in sacks.

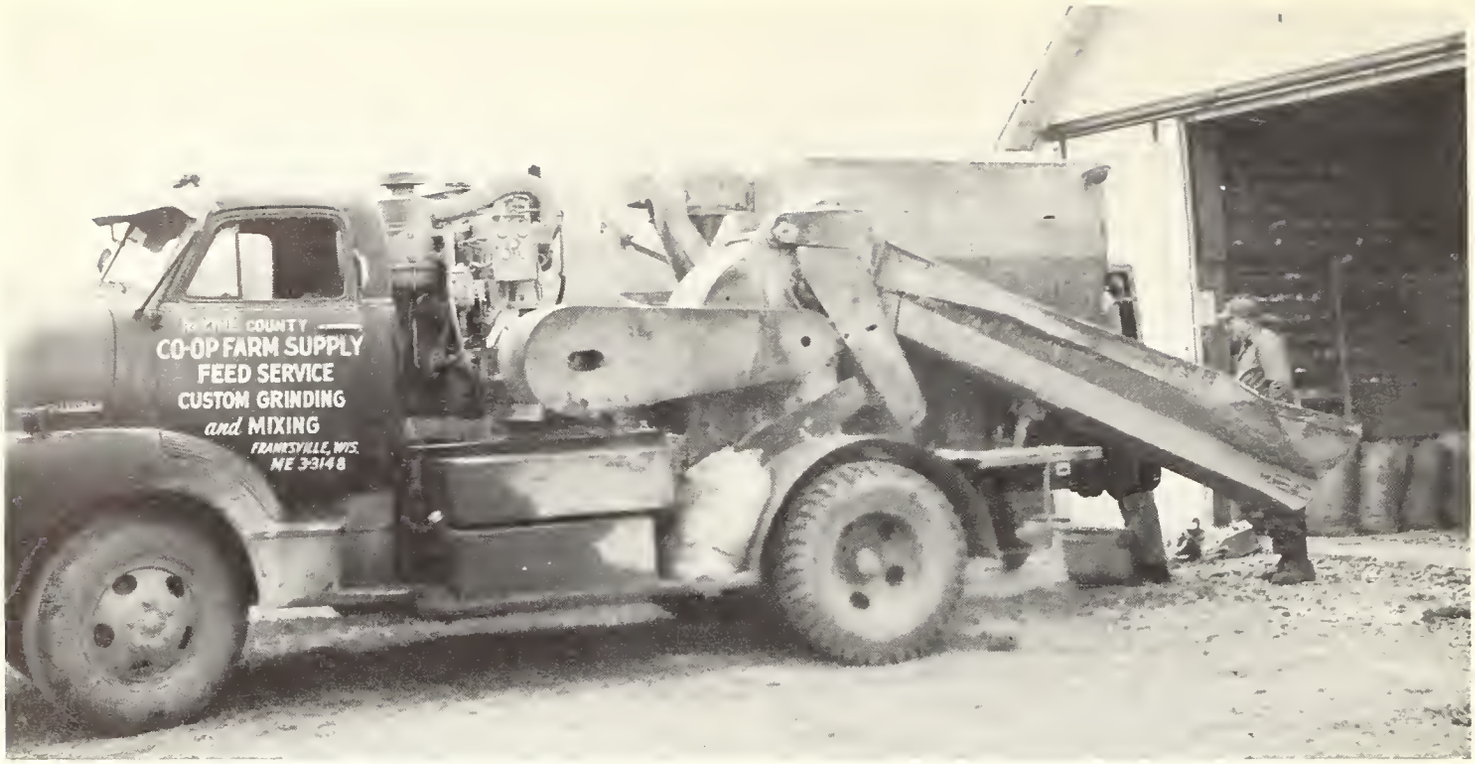
Mill Number 4

	Amount	Per ton
Income		
Grinding and mixing revenue	$8,344	$3.47
Molasses margin on sales of $8,800	4,400	1.83
Total milling revenue and molasses margin	12,744	5.30
Expenses		
Wages	4,760	1.98
Payroll costs	255	.11
Depreciation	3,498	1.45
Repair and upkeep	1,654	.69
Gas, oil, and diesel fuel	1,247	.52
Insurance	111	.05
License	56	.02
Personal property taxes	97	.04
Travel	50	.02
Heat	90	.04
Advertising	20	.01
Telephone	75	.03
Office supplies and postage	100	.04
Bad debts	100	.04
Interest on average investment @ 5 percent	457	.19
Total operating expenses	12,570	5.23
Net margin from grinding, mixing, and molasses	174	.07
Gross margin on ingredient sales of $24,947	3,701	1.54
Margins available to pay for delivery and warehousing of ingredients and for other overhead items	3,875	1.61

The operator carried a portable aluminum conveyor for unloading the 5 percent of the feed unloaded in bulk. About 59 percent of the volume was dairy, 30 percent beef cattle, 4 percent hog, 4 percent sheep, and 3 percent was poultry feed. Farm feeds ground were corn, oats, barley, and hay -- representing 68, 16, 5, and 2.2 percent, respectively, of the total volume. Of the nonfarm ingredients, molasses represented 4 percent, concentrates 3.4 percent, and other ingredients 1.4 percent of the total volume.

Ninety-five percent of the patrons were serviced on regular routes, 60 percent of them weekly and 40 percent every 2 weeks. The territory was divided into five routes, and the operator picked up half of the biweekly accounts in each area each week. The 5 percent on an order basis were serviced off the regular routes when the truck was in the area. No special runs were made to service these orders.

Patrons had learned to have all the grain ready at one spot. This had reduced moving the mill to only 1 move in 100 stops and had saved about 10 hours a week of the operator's time. The help received from patrons in feeding ingredients into the mill and removing the



This mobile feed mill is backed up to a farmer's corn crib ready to grind cob corn.

bags saved another 6 hours a week of the operator's time.

Ingredients were delivered separately on regular feed delivery routes twice a week. A $3 delivery fee was charged per ton.

The rate for grinding and mixing a dairy grind was $4.50 a batch, sacked or bulk. An additional 50 cents was charged for material to be ground fine, and a discount of 50 cents was given if a minimum of 100 pounds of supplement was purchased. Molasses was priced at one-half cent a pound less for orders of 100 pounds or more.

Patrons were expected to help the operator and 80 percent did help feed the mill and take the feed away. Those who were regularly away when the mill was due were charged $1 additional per batch. A minimum fee of $4 a batch was charged when less than a full batch was ground and mixed.

The operator was paid on a commission basis, getting one-third of the grinding and mixing revenue, one-half cent a pound for all molasses, and 10 cents a bag for all branded feeds sold. In addition, he received $4.50 a week allowance for maintenance of the unit, and was allowed 2 weeks vacation and a maximum of 12 days sick leave, both based on average earnings per week. He was guaranteed a minimum of $60 a week, but commissions had not dropped below the minimum during the year.

The mixing revenue and molasses gross margin together came within $634 of paying for all operating expenses. In addition, ingredient sales brought a gross margin of $1,946, but warehousing and any delivery costs not covered by the regular $3 a ton delivery fee had to

be covered before any of that margin could be applied on the loss from the mobile mill operation.

Following is the operating statement of mobile mill number 5 for its operating year 1957-58:

Mill Number 5

	Amount	Per ton
Income		
Grinding and mixing revenue	$10,694	$3.99
Molasses margin on sales of $8,640	3,240	1.21
Total milling revenue and molasses margin	13,934	5.20
Expenses		
Wages	3,120	1.17
Commissions	1,964	.73
Payroll costs	478	.18
Depreciation	2,812	1.05
Repair, upkeep, gas, oil, and diesel fuel	5,000	1.87
Insurance	98	.04
License	56	.02
Personal property taxes	221	.08
Travel	40	.02
Advertising	100	.04
Telephone	40	.01
Office supplies and postage	200	.07
Interest on average investment @ 5 percent	439	.16
Total operating expenses	14,568	5.44
Net margin from grinding, mixing, and molasses	-634	-.24
Gross margin on ingredient sales of $15,845	1,946	.73
Margins available to pay for delivery and warehousing of ingredients and for other overhead items	1,312	.49

Two-Man, Single-Mill Operations

This section covers the three single-unit mills operating with two men per mill.

Mobile Milling Operation Number 6

Mill number 6 was a two-man, single-unit operation that started in the fall of 1952. It was the first unit in the area and preceded the association's stationary mill. Later the cooperative added a second mobile mill but sold it in 1955 when it installed a stationary mill.

This mill serviced about 70 patrons and ground and mixed a total estimated volume of 3,350 tons in 1957-58. Seventy percent of the volume was dairy feed,

28 percent hog feed, and 2 percent poultry feed. Approximately 90 percent of the volume was unloaded in bulk.

Rate charged was $4.50 a batch if unloaded in bulk, plus 50 cents more if unloaded in sacks. Batches averaged 2,600 pounds. A discount of 20 cents a bag of supplement bought was granted up to a maximum of 50 cents a batch. No variation in rate was made for fineness of grind. The minimum charge for a stop was $4.50. Rates charged at the stationary mill were 10, 12, and 14 cents a bag, respectively, for coarse, medium, and fine grind. Bags brought in ranged from 50 to 100 pounds in size.

Ingredients were delivered separately on regular routes, and the delivery charge was $2 a ton. Ninety percent of the grinding service was done on the basis of regularly scheduled stops.

The operator and helper were both on a monthly salary. In addition, the operator received a combined grinding and molasses commission which ranged from 10 to 40 percent of the grinding revenue and from 10 to 15 percent of the molasses gross margin. The grinding commission started at 10 percent of all grinding revenue above $250 a week and went up to 40 percent of all that above $400 a week. The molasses commission began at 10 percent of the molasses gross margin ranging between $600 and $800 a week and 15 percent of all that above $800 a week.

Total grinding and mixing revenue plus molasses margin was $2,357 less than total operating expenses. It was estimated that a gross margin of about $4,736 was made on the $40,140 of ingredient sales through the mobile mill. Deducting the loss on the mobile operation, left a margin of $2,352 to apply on delivery and warehousing of the ingredients.

This association suffered from lack of sales effort. Some volume had been lost to the former operator of the association's second mill who now operated a mobile milling business of his own in the association's territory. The association's present operator did no selling and the office had not done enough. The new manager, who was employed at the end of the 1958 fiscal year, was aware of the problems and was trying to promote volume and concentrate sales.

The operating statement of mobile mill number 6 for its operating year 1957-58 is at the top of page 41.

Mobile Milling Operation Number 7

Mill number 7 was a two-man, single-unit operation started in January 1954. The original mill -- equipped with a bulk unloading auger, 75 cu. ft. mixer, 16 in. hammermill, and 100 hp. diesel engine -- was still in use. A second unit had later been added but was not replaced when it burned because the association lacked sufficient patrons to operate two units efficiently.

The mill serviced approximately 100 patrons during 1957-58 and volume totaled 3,500 tons, half of it unloaded in bulk. Estimates indicated that 80 percent was dairy feed, 15 percent hog feed, and 5 percent was poultry feed. Of the ingredients ground and mixed, 38 percent was cob corn, 38 percent oats, 5 percent hay, 5 percent molasses, and 14 percent consisted of concentrates, protein meals, and low-protein byproduct feeds.

Rates charged were $4 a batch for dairy grind unloaded in bulk. Batches

Mill Number 6

	Amount	Per ton
Income		
Grinding and mixing charges	$11,276	$3.36
Molasses margin on sales of $6,459	2,419	.72
Total milling revenue and molasses margin	13,695	4.08
Expenses		
Labor	5,822	1.74
Commissions	110	.03
Payroll costs	303	.09
Rental of mobile mill and truck	4,570	1.36
Repair, upkeep, gas, and oil	3,105	.93
Diesel fuel	1,028	.31
Insurance	292	.09
Personal property taxes	85	.03
License fees	215	.06
Heat	42	.01
Office supplies and postage	150	.04
Advertising	123	.04
Telephone	76	.02
Bad debts expense	72	.02
Miscellaneous supplies	59	.02
Total operating expenses	16,052	4.79
Net margin from grinding, mixing, and molasses	-2,357	-.71
Gross margin on feed ingredient sales of $40,140	4,736	1.41
Margins available to pay for delivery and warehousing of ingredients and for other overhead items	2,379	.70

were estimated to average 1,900 pounds. An additional charge of 50 cents a batch was made for fine grind and another 50 cents if unloaded in sacks. Also a 15-cent discount had been given on the grinding and mixing charge for each bag of branded concentrate purchased, but it had been discontinued at the time of this study.

The operator's helper drove a separate concentrate truck to accompany the mill and deliver ingredients. About 60 percent of this truck's time was devoted to this particular service.

Operators were both on a weekly salary. In addition, the operator received a molasses bonus of one-third cent a pound on all molasses sold. All patrons had service on a route basis every 2 weeks. Volume varied from a peak of 85 tons a week in the winter to a low of 40 tons a week in the summer months.

Net margins from grinding, mixing, and molasses was $2,081, or 59 cents a ton. In addition an estimated net margin of $3,096 was made on $39,765 of ingredient sales after allowing for use of truck and warehousing labor. No separate delivery labor was involved since the helper drove the delivery truck. Adding the net of $2,081 from mixing and molasses sales to the net of

$3,096 from ingredient sales gave a total of $5,177 net savings before overhead costs.

Following is the operating statement of mobile mill number 7 for its operating year 1957-58:

Mill Number 7

	Amount	Per ton
Income		
Grinding and mixing charges	$13,557	$3.87
Molasses margin on sales of $13,000	5,850	1.67
Total milling revenue and molasses margin	19,407	5.54
Expenses		
Labor	7,540	2.16
Commissions	1,100	.31
Payroll costs	598	.17
Rent of mobile unit	4,200	1.20
Repair and upkeep of mill	1,000	.29
Repairs on truck	600	.17
Fuel oil for mill	1,054	.30
Gas and oil for truck	520	.15
Insurance	257	.07
License	215	.06
Personal property taxes	180	.05
Office supplies	22	.01
Telephone	26	.01
Miscellaneous	14	(1)
Total operating expenses	17,326	4.95
Net margin for grinding, mixing, and molasses	2,081	.59
Gross margin on feed ingredient sales of $39,765	5,813	1.66
Less: Use of truck and warehousing labor	2,717	.77
Margin on ingredients after delivery and warehousing	3,096	.89
Net margin from mixing, molasses, and ingredient sales (after allowing for use of delivery truck and warehousing labor but no overhead items)	5,177	1.48

[1] Less than 1 cent.

Mobile Milling Operation Number 8

This two-man mobile unit was added to an existing stationary mill operation in the fall of 1953. It was the first unit in the area. An estimated 100 patrons were serviced with a total volume of 3,600 tons of mixed feeds in 1957-58. About 90 percent of the volume was dairy and 10 percent was hog feed. Corn, oats, and hay were the farm-grown items ground and represented 35 percent, 42 percent, and 3 percent of the total volume, respectively. Molasses made up 5 percent of the total, high

protein concentrate 6 percent, and protein meals 9 percent.

The original unit, equipped with an unloading auger, was still in use but the truck chassis had been replaced with a larger size within 2 years.

Grinding rates were $4 a batch, estimated to average a ton in size. The same rate applied on fine or coarse ground, or bulk or sacked unloaded feed. The only variation made in the rate was a discount of 15 cents for each bag of branded concentrate bought. The rate at the stationary mill was 10 cents a hundredweight for all materials brought in for grinding.

All the ingredients, except those for a few special orders, were delivered separately on regular feed delivery routes. All the patrons were serviced on regular routes, with 95 percent serviced every other week and 5 percent serviced weekly. The mill was moved an average of about 5 times per farm. Volume varied from 100 tons a week during the peak season in the winter months to a low of 50 tons a week in the summer months.

Mill Number 8

		Amount	Per ton
Income			
Grinding and mixing charges		$13,326	$3.70
Molasses margin on sale of $10,658		4,050	1.13
Total milling revenue and molasses margin		17,376	4.83
Expenses			
Labor		6,687	1.86
Commissions		692	.19
Payroll costs		455	.13
Rental of mobile mill and truck		4,200	1.17
Repair and upkeep		974	.27
Gas and oil		872	.24
Diesel fuel		965	.27
Insurance		248	.07
License		190	.05
Advertising		75	.02
Telephone		43	.01
Office supplies and postage		70	.02
Miscellaneous		178	.05
Total operating expenses		15,649	4.35
Net margin from grinding, mixing, and molasses		1,727	.48
Gross margin on feed ingredient sales of $35,144		5,832	1.62
Less: Use of truck for delivery	$500		
Labor delivering and warehousing	$4,000	4,500	1.25
Margin on feed ingredients above cost of delivery and warehousing labor		1,332	.37
Net margin from grinding, mixing, and ingredient sales after allowing for cost of delivery and warehousing labor but no overhead items		3,059	.85

The operator and his helper were both on a monthly salary plus a share of the net mill and molasses revenue. The operator was paid 15 percent and the helper 5 percent of both the molasses margin and the net grinding and mixing revenue after allowing for all direct expenses including rental of the truck and unit.

This operation left a net margin of $1,727 from grinding and molasses revenue after allowing for all operating expenses in 1957-58. In addition, an estimated net of $1,332 was realized on the sale of 540 tons of feed ingredients above the cost of delivery and warehousing labor. The two margins together left $2,641 from the grinding and mixing operation and the sale of molasses and ingredients. In other words, this amount was available from the mobile milling operation exclusive of its share of general overhead costs of the cooperative.

The operating statement of mobile mill number 8 for its operating year 1957-58 is at the bottom of page 43.

Two-Man, Multiple-Mill Operations

This section covers the three mills with either 2-unit or 3-unit operations and with two men to each unit.

Mobile Milling Operations Number 9

This two-mill operation -- number 9 -- in a very intensive dairy area, started with one mill in 1952 and added the second unit 2 years later. Each mill used two operators. This association was the first with mobile service in the area, but at the time of the study four other firms were operating a total of eight mills within this association's territory. The association does not have a stationary mill or elevator.

Each mill had a 75 cu. ft. mixer, a 100 hp. diesel power plant and an unloading auger. All but 5 percent of the total volume was unloaded in bulk.

An estimated 100 patrons were serviced with 5,800 tons of mixed feed in 1957-58. Eighty percent was dairy feed, 10 percent steer feed, and 10 percent was hog feed. Of the materials ground and mixed, 67 percent was corn, 15 percent oats, 4.5 percent hay, 4.5 percent molasses, 5 percent concentrates, 2 percent protein meals, and 2 percent was low-protein ingredients.

The base rate for grinding and mixing was $4.75 a batch for dairy grind unloaded in bulk. Batches averaged 2,400 pounds so the ton rate was about $3.95. An additional 75 cents a batch was charged for a medium grind for hogs and 50 cents above that or $1.25 for a fine grind for poultry feeds. Fifty cents more was charged if the feed had to be sacked. In addition to the above adjustments, a discount of 15 cents a bag was given for each bag of branded feeds that was used in the mix up to a maximum of 45 cents a batch.

The minimum rate for a stop was $2.50, but this was no problem as all patrons either had a full batch mixed, or else were scheduled every 2 weeks. Ninety percent of the patrons were serviced on the basis of regularly scheduled stops. Of these, 95 percent were serviced weekly, 2 percent twice a week, and 3 percent every other week.

The association paid all operators and helpers a straight weekly salary.

Total mixing revenue and molasses gross margin lacked $57 of covering total operating expenses in 1957-58. An estimated gross margin of $2,302 was realized from ingredient sales above delivery costs. Combining the two figures left an operating margin of $2,245 from the mobile milling operation and ingredient sales after paying all operating costs and delivery of ingredients. This amount was left from the year's operation to pay for ingredient warehousing, the manager's and the salesman's salaries, and other overhead costs.

Following is the operating statement of mobile mill number 9 for its operating year 1957-58:

Mill Number 9

	Amount	Per ton
Income		
Grinding and mixing revenue	$23,204	$4.00
Molasses margin on sales of $13,281	7,475	1.29
Total milling revenue and molasses margin	30,679	5.29
Expenses		
Wages	15,058	2.59
Payroll costs	960	.17
Rental of mobile unit	4,424	.76
Depreciation	2,985	.52
Repair and upkeep	1,896	.33
Gas and oil	2,051	.35
Diesel fuel	1,984	.34
Insurance	280	.05
License fees	405	.07
Travel	60	.01
Heat	36	.01
Telephone	20	(1)
Office supplies and postage	90	.02
Interest on average investment @ 5 percent	373	.06
Total operating expenses	30,622	5.28
Net margin from grinding, mixing, and molasses	57	.01
Gross margin on ingredient sales of $40,992	5,442	.94
Less: Labor and truck use for delivering ingredients	3,140	.54
Margin on ingredients above delivery costs	2,302	.40
Net margin from grinding, mixing, molasses and ingredient sales after paying operating expenses and delivery of ingredients	2,245	.39

[1]Less than 1 cent.

Mobile Milling Operation Number 10

This 2-mill operation -- number 10 -- had two operators on each mill. The original unit was acquired in 1952 to get into the feed business in the area and was the first portable unit in the territory. A second mill was added early in 1954 and a stationary custom mill was installed in 1955.

The original unit, now mounted on a new chassis, has a 75 cu. ft. mixer and 100 hp. diesel engine. The second unit carries a 100 cu. ft. mixer with a 170 hp. LP gas-operated diesel engine. Power plants on both units have been replaced, the first within 4 years and the second within 3 years of the original purchase. The two different size mixing units are a problem whenever one mill has to be used on a route usually handled by the other. Batches mixed with the two units averaged 2,400 and 3,400 pounds respectively, for the 75 and 100 cu. ft. mixers.

A total of 115 patrons were serviced with grinding and mixing during the 1957-58 year. Volume was estimated at 5,830 tons, 70 percent of it unloaded in bulk. Some corn cobs and other miscellaneous items were ground for approximately 25 other patrons.

About 70 percent of the feed mixed was dairy cattle feed, 15 percent hog feed, 10 percent steer feed, and 5 percent poultry feed. Farm-grown feedstuffs ground included corn, oats, hay, and corn cobs. They represented 30, 18, 20, and 10 percent, respectively, of the total volume. About 7 percent of the total was molasses, 5 percent high-protein concentrates, 5 percent protein meals, and 5 percent was low-protein ingredients.

Grinding and mixing rates were $4.75 a batch, estimated to average about 2,400 lbs. The only variation made from this rate was a discount of 15 cents a bag for ingredients purchased.

Operators and helpers were on a straight weekly salary and a $5 bonus was paid both the operator and the helper for each new patron retained for a month or more. A molasses bonus had been tried for a period and had increased molasses sales but was discontinued as soon as the molasses sales again leveled off.

Grinding and mixing revenue and molasses margin together totaled $4,485 less than the operating expenses, but ingredient sales netted $7,932 above delivery costs and warehousing labor. This left a net margin of $3,447 from grinding, mixing, molasses, and ingredients. The manager estimated that about $1,100 of his time and $884 of the bookkeeper's time was chargeable to the mobile milling operation. Subtracting these two items left a net of $1,239 from the mobile milling operation after paying all operating expenses, ingredient delivery, warehousing labor, and a share of the manager's and the bookkeeper's time. It can therefore be assumed that the mobile milling operation added $1,239 to the association's net savings because the other overhead items were considered unavoidable and would continue even if the mobile milling operation was discontinued.

The operating statement of mobile mill number 10 for its operating year 1957-58 is at the top of page 47.

Mobile Milling Operation Number 11

This three-mill operation -- number 11 -- had two men on each mill. This

Mill Number 10

	Amount	Per ton
Income		
Grinding and mixing revenue	$21,013	$3.60
Molasses margin on sales of $14,850	6,500	1.12
Total milling revenue and molasses margin	27,513	4.72
Expenses		
Wages	15,570	2.67
Payroll costs	981	.17
Rent of mobile unit	3,032	.52
Depreciation on mobile unit	2,133	.37
Repair and upkeep	5,078	.87
Gas and oil	1,276	.22
Diesel fuel	2,051	.35
Insurance	397	.07
License fees	360	.06
Personal property taxes	150	.02
Travel	200	.03
Telephone	245	.04
Office supplies and postage	100	.02
Collection expenses	100	.02
Interest on average investment @ 5 percent	325	.05
Total operating expenses	31,998	5.48
Net margin from grinding, mixing, and molasses	-4,485	-.76
Gross margin on ingredient sales of $59,292	10,220	1.75
Less: Labor and truck use for delivering ingredients	2,288	.39
Margin on feed ingredients after delivery costs and warehousing labor	7,932	1.36
Net margin on mixing molasses and ingredients after paying for operating costs, ingredient delivery and warehousing labor	3,447	.60
Less: Share of manager's time $1,100		
Share of bookkeeper's time $884	1,984	.34
Net from grinding, mixing, molasses and ingredients after operating expenses, ingredient delivery, warehousing labor, and share of manager's and bookkeeper's time	1,463	.26

association purchased the original unit early in 1952 in order to offer custom mixing service to feed patrons since it did not operate a stationary mill. The unit was the first mobile mill in the area. A second mobile mill was added later the same year and a third unit within 2 years after the first one. There were three other operators, each with a single unit, operating on the fringes of the association's territory.

All three mills of the cooperative were the same size, with 75 cu. ft. mixers

and 100 hp. diesel engines. Each had an unloading auger for unloading in bulk. The original equipment was still in use on each unit except that the original chassis on the oldest unit had been replaced and two of the power plants had been overhauled.

The association serviced 190 patrons during 1957-58 and ground and mixed about 10,000 tons of mixed feeds. Approximately 60 percent of the volume was unloaded in bulk. An estimated 75 percent was dairy feed, 15 percent hog feed, and 5 percent each was steer and poultry feed. Of the material ground, 50 percent was corn, 30 percent oats, 7 percent hay, 3 percent molasses, and 10 percent was concentrates and other bagged ingredients.

Grinding and mixing fees were 18 cents per 100 pounds for coarse ground material and 20 cents per 100 pounds if the material was fine ground. The minimum charge for a farm stop was $1.50, but very few stops were for less than a full batch.

The mill operators and helpers received a straight weekly salary. In addition, the operators, but not the helpers, received a molasses commission of one-half cent a pound for each pound of molasses sold. With the molasses commissions, the operators were earning good wages but helper turnover was high. The manager would have liked to split the bonus with the helpers but felt he could not change the practice without making the operators dissatisfied.

The mobile mill is grinding cob corn for blending with concentrates and other grains. The mixed feed will be bulk loaded into the patron's trailer.

This three-unit operation incurred a loss of $3,146 from the milling and molasses sales after allowing for all operating expenses. It made an estimated margin of $4,742 on concentrate and ingredient sales after allowing for delivery charges of $4 a ton. Combining these two figures left a net margin of $1,597 available to cover ingredient, warehousing, and other overhead costs.

Following is the operating statement of mobile mill number 11 for its operating year 1957-58:

Mill Number 11

	Amount	Per ton
Income		
Grinding and mixing revenue	$35,844	$3.58
Molasses margin on sales of $21,215	10,247	1.03
Total milling revenue and molasses margin	46,091	4.61
Expenses		
Wages	23,981	2.40
Commissions	2,577	.26
Payroll costs	1,532	.15
Depreciation	9,315	.93
Repair, upkeep, gas, oil diesel fuel	8,009	.80
Insurance	954	.10
Licenses	600	.06
Personal property taxes	350	.03
Heat	223	.02
Advertising	173	.02
Telephone	25	-
Office supplies and postage	22	-
Collection expenses	35	-
Bad debts	157	.02
Interest on average investment @ 5 percent	1,284	.13
Total operating expenses	49,237	4.92
Net margin from grinding, mixing, and molasses	-3,146	-.31
Gross margin on ingredient sales of $72,550	10,282	1.02
Less: Delivery cost @ $4 a ton	5,540	.55
Margin on ingredients after allowing for cost of delivery	4,742	.47
Net margin from grinding, mixing, molasses, and ingredient sales after allowing for operating costs and delivery of ingredients	1,596	.16

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